SOCIETY OF AMERICAN FORESTERS 1900

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Volume 57
Number 1

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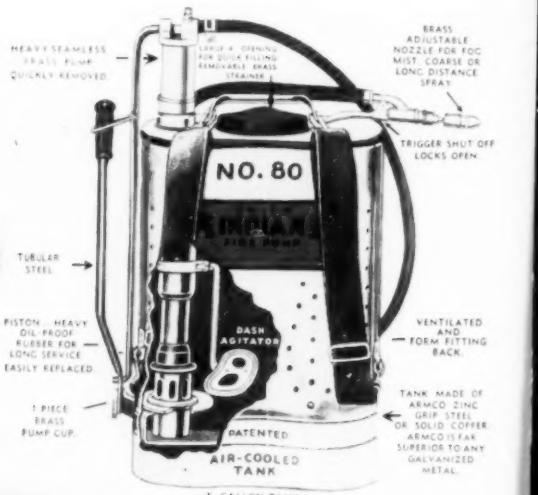
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COVER: Faller stands on the stump of a tree he has just felled on Crown Zellerbach's Clackamas Tree Farm near Molalla, Oregon. *(Photo courtesy Crown Zellerbach Corp.)*

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Council's Column

Further Thoughts on Professional Responsibility

In planning this first contribution to the Council's Column for 1959, I had occasion to review the past 12 issues, in search of a particularly cogent argument which might well be restated as a special challenge to the Society at the start of this new year. The contributions of the members of the Council included a number of likely topics, but my final selection fell on Bill Hagenstein's discussion of "Professional Responsibility" in the May issue of the JOURNAL. I find myself in substantial agreement with this call to the Society to face the need for free and open discussion and for action on controversial policy issues at the national as well as the Sectional level. The time is here when, in the interest of effective management of our wildland resources and for the sake of our professional well-being, we must place the influence of our considered opinion behind issues that may vitally affect forestry in the years ahead.

Unless we are prepared to exert our professional influence, leadership in shaping legislation on natural resource management—including possible restrictive steps relating to forestry and its practices—may go by default to a coalition of primarily lay groups and of organizations with essentially single-purpose interests in our forest resource. Such a coalition is now acting in the dispute over the use of pesticides and in matters relating to wilderness areas, to name but two issues. We must not set forestry apart, as something for professional concern alone, but rather we must recognize our urgent need for the good will and support of all responsible groups operating in the "conservation" sphere, as we try to promote the maximum use of our wildland resource for the greatest benefit to the greatest number of people. More than a few of the problems that now face the profession are so broad in their application that they directly affect the interests of individuals in various walks of life; they thus become the definite concern of the organizations to which these people belong—the garden clubs, sportsmen's groups, campers' associations, and others among the various groups with economic, esthetic, or recreational interests in the great outdoors. But if we are to gain the support of these "conservationists," we must make a realistic showing of professional solidarity in presenting our position on the matters under consideration, as well as full evidence of having weighed dispassionately all important aspects of the issues we support (or oppose).

It is in the development of a substantial semblance of professional solidarity on controversial issues that our open forum discussions have their greatest potential value. To attain that objective will require rational and tolerant consideration of all points of view. The element of emotionalism has no place in such deliberations, nor do those of partisan politics or selfish interest. In providing the opportunity for full discussion and "grass roots" participation, the Section meetings and especially the crowded national sessions have much less to offer than the Chapter gatherings; it is heartening to learn of the consideration which is given to controversial matters in some Chapter programs. However, the major policy issues which face us today are largely national in scope, arising mainly from real or potential conflicts in forest land use, and as such they deserve the considered opinion of the Society as a whole.

Opinions on issues of national importance may be expressed through the Points of View section of the JOURNAL OF FORESTRY, a medium that has been largely neglected for such purpose in recent years. The neglect comes, I might point out, not as the result of discouragement by the editor, but from the failure of members to submit statements. I want to emphasize the opportunity that members have to express themselves in this forum, naturally with due consideration for the propriety of the statements and the limitations of available space in the JOURNAL.

Obviously, the Society's Annual Meeting is the logical place for discussion of controversial subjects of national importance to the profession, and the Council has given definite consideration to the matter. The major problem is to find time for such a session among the welter of Division meetings and other established fixtures on the program. By way of experiment at the Salt Lake City meeting last fall, the business session was drastically curtailed in order that time might be made available for panel discussions[1] of two topics of widespread current interest: the proposed National Wilderness Preservation System and Aerial Spraying of Woodlands with Pesticides. Despite certain anticipated shortcomings, notably lack of time for floor discussion, the reaction to the experiment was favorable. We are encouraged to consider a possible extension of the project at the San Francisco meeting next November. The general plan and the selection of a specific discussion topic (or topics) will receive the attention of the Council at its meeting in April, and I would welcome prior suggestions from the membership.

In bringing this column to a close, I want to extend to all members of the Society the best wishes of the officers and Council for a happy and prosperous year. May 1959 be a year of outstanding accomplishment in all areas of professional development in forestry!

GEORGE A. GARRATT
President, SAF

[1]Editor's note.—Published in the December 1958 JOURNAL.

The Canadian Institute of Forestry—Historical Highlights[1]

J. W. B. Sisam

EVERYONE WILL AGREE, I am sure, that on this occasion when we are celebrating the 50th anniversary of the founding of our association, some reference should be made to its history—to the story of its development and of the projects it has undertaken over the years on behalf of our profession, and the success attained. I appreciate the honor of being asked to undertake this task, knowing full well and without any sense of false modesty that many of our members are far better qualified, both in their personal knowledge of the subject and their ability to set it before you in an interesting way.

First the setting. In 1908 forestry in this country was just becoming established as a university course with practically no background of professional practice or tradition. We were a profession *de novo* and represented a quite different pattern from that which had evolved in Europe where, only after many years of field experience and experimentation was forestry brought into the classroom. As one of our members once expressed it, "When our forestry schools were established, forestry as a profession and as practiced in the bush in Canada was in its puerile infancy."

That was our condition and status when F. W. H. Jacombe, technical assistant of the Forestry Branch, Ottawa, first suggested the formation of a national association of professional foresters. No doubt this would have come about in any case, but the idea was perhaps stimulated at the time by the example of the Canadian Forestry Association which, since its establishment in 1900, had done much through its annual meetings and the publication of the *Canadian Forestry Journal* to promote interest in a wide range of forestry matters in this country. Also the success and increasing influence of the Society of American Foresters must have provided a strong incentive to members of the profession in this country.

J. W. B. SISAM

The inaugural meetings were held on March 12 and 13, 1908, in Montreal at the time of the ninth annual meeting of the Canadian Forestry Association. At the second of these meetings, The Canadian Society of Forest Engineers, the progenitor of the Canadian Institute of Forestry, was formally established, a constitution was adopted, and officers elected. The charter members, 12 in number, were men engaged in forestry work in this country, 8 being graduates of university forest schools.

It is of interest to note that three of these men were employed with the dominion government, three with industry, four with provincial governments, and two with the university. Of the 12, one is still living in the person of E. J. Zavitz, former provincial forester and deputy minister of forests in Ontario; though officially retired for some years Dr. Zavitz is still called upon from time to time to act as consultant for the Department of Lands and Forests in that province. He is with every justification referred to affectionately as "The Father of Ontario Forestry."

The name Canadian Society of Forest Engineers was suggested by Mr. Jacombe, having in mind in those days that the word forester was little known or understood in Canada other than in connection with certain fraternal insurance organizations.

Thus, our association came into being. What have been the aims and objectives of its founders and their successors? It is a knowledge of these and of the success we have had in their attainment that makes possible the evaluation of our history.

I suppose our Charter Members were primarily concerned in getting to know one another, in having the opportunity to discuss among themselves their common interest, Canadian forestry, and in promoting among the general public an awareness and understanding of their profession and the work they were doing. According to the minutes of the inaugural meeting, the aims of the Society in the beginning were "The advancement of its members in the theory and practice of forestry by the discussion of technical and professional topics, the promotion of a better mutual acquaintance among Canadian foresters and the cultivation of an *esprit de corps* among the members of the profession." Subsequently, changes were made in the wording and the aims somewhat broadened so that today and

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[1]This paper by the past president of C.I.F. was presented at the Institute's fiftieth anniversary meeting held in Fredericton, New Brunswick, October 5-9, 1958.

for some years past our main objectives have been:

1. To advance the members in their knowledge of the science and practice of forestry and cultivate an esprit de corps *within the profession*

2. To encourage a wider understanding of the problems of forestry and improve forestry practice in Canada.

How successful have we been in attaining these objectives? At times progress has been slow and uncertain, and on occasion we have been subject to serious criticism by our members, mainly for sins of omission. In making an appraisal of our accomplishments, we should bear in mind that we are a young profession feeling our way through a period of transition in the methods of handling the resource for which we are responsible, and as such perhaps we have been more than usually susceptible to the changes and chances of the 20th century.

It has been said that people, and by implication their institutions, are the product of their history and environment; thus the institute, as we know it today, is the result of what we and our predecessors have put into it over the years which in turn has undoubtedly been tempered by a changing, dynamic environment of peace and war, prosperity and depression.

Having in mind the rather ephemeral nature of forestry in this country fifty years ago, it was suggested that in the beginning the social aspect of the Society be emphasized with the discussion of technical subjects to come later as forestry reached a more advanced level.

In keeping with this, the annual meetings during the first decade or so were usually of an informal nature, often being held at the Laurentian Club in Ottawa. According to the record, a good deal of the time was devoted to revising the Constitution with the aim, no doubt, of developing a framework within which the organization could function most effectively.

From this viewpoint, perhaps the highlight of the first few years was the granting of an Ontario Charter on September 9, 1915 by which the Society was given the exclusive right to the name Canadian Society of Forest Engineers and a legal status through which wider public recognition of the profession might be attained. This provincial charter was to serve the society for the next 35 years.

At that time, as indeed throughout our history, qualifications for membership was a subject of constant concern. It is perhaps of interest to note that in 1914 it was decided that the basic requirement for admission to active membership would be graduation from a forestry school in good standing and subsequently motions were passed to the effect that the schools at the Universities of New Brunswick and Laval met this requirement. That is apparently as far as our efforts in accreditation have gone.

As the society grew and became more complex and new problems arose, the constitution was almost constantly under revision in one way or another. In commenting on this fact in 1930, Dr. C. D. Howe suggested that it must have significance but, he went on to say, "What that significance is will depend on one's point of view. It might mean an aspiration towards perfection in organization, on the other hand it might mean that the members were more interested in the structure of the organization than in its functions, or it might be an expression of unformulated discontent on the part of the membership venting on the basic laws."

Dominion Charter Granted

Whatever the reason, by 1945 it was generally recognized that a further revision was necessary having in mind that a national body such as ours should function under a Dominion charter, that its name should be more closely related to the overall meaning and purpose of the profession, and that the bylaws should be such as to insure a truly professional status for the Society. These changes were brought about when in 1950 at the annual meeting in Sault Ste. Marie, the Canadian Society of Forest Engineers became the Canadian Institute of Forestry under a Dominion charter and with appropriate changes in constitution and bylaws. This of course was an event of major importance in our recent history.

Administratively, we have been concerned almost from the first with the possibilities of a full-time secretary to look after our affairs. With one eye cast rather enviously on the outstanding success of the Society of American Foresters under the very able direction of our friend Henry Clepper and the other on a relatively small membership and low income bracket, we have imposed heavily on the good services of a few of our members over the years to handle our head office administration and have also tried one or two experiments. At last, however, in this our 50th year we have attained to a full-time secretary and welcome J. J. E. Dosne to this, his first annual meeting, in that capacity.

Let us return briefly to the earlier period of our history. As knowledge of forest conditions increased and a beginning was made in dealing with some of the related problems, an increasing proportion of the time of the annual meetings was devoted to technical discussion and the presentation of prepared papers. Perhaps 1921 can be taken as the year that marks the transition from the informal gathering to the more highly organized meeting with a scheduled program of technical papers, something similar to what we have today. This transition is suggested by the introductory remarks of the president of that year, the late Elwood Wilson, when he said, "I have never felt before that we were really strong enough to try to get together for a regular meeting; we generally sit around the table and discuss things and almost always we have been indebted to Mr. Campbell at the Laurentian Club. We thought this year we would try

the scheme of getting together more formally and at greater length. We are going to try to discuss some of the problems that affect us as foresters. . . ."

The trend towards a more formal technical program was further emphasized in the following year when a meeting was held in Toronto under the joint auspices of the C.S.F.E. and the Society of American Foresters; many papers were presented on a wide range of subjects. This meeting served also to underline the fact that these two societies had then as they do today many points of common interest. At the conclusion of that meeting the feeling was expressed that it would be in the interests of the profession as a whole if joint meetings could be held more frequently. It was to be thirty years before a second such meeting was possible, that time in Montreal; it was indeed a highlight in the recent history of our association and we are all looking forward to our next meeting with the SAF which is scheduled for Minneapolis in 1961.

The annual meeting has always been a feature of the society and institute and over the years changes have taken place that have considerably increased interest and value to the membership as a whole. Thus prior to 1945 by far the majority of these meetings were held in eastern Canada; but beginning in that year with the Fort William meeting a pattern has been evolved whereby we move fairly regularly across the country. This has been important in helping to make our association national in function as well as in name. Furthermore, the appointment of an annual meeting committee with an organizational plan before it, the holding of field trips, the selection of a theme of national significance —these and other developments have led to a wider interest, better attendance, and more general participation. For purposes of illustration I would cite the Winnipeg meeting of 1953 with its theme "The Forestry Situation in Canada —Present and Future" as one of a number of highly successful meetings held in recent years. There is every indication that the 1958 meeting will illustrate my point to perfection.

That period known variously as "The Roaring Twenties" or "The Age of Confusion," proved, after a rather shaky start, to be an era of rapid industrial development as exemplified in particular by the pulp and paper industry. Paralleling this was a considerable progress in certain aspects of forestry, particularly in fire protection techniques, inventory surveys, and the organization of research. Governments began to take a more positive approach towards forestry policy. By 1929 it appeared that we were about to enter the golden age of forestry in this country. One of our members pointed out that never before in Canada had so much interest been taken in the proper care and development of our forests, that from coast to coast each province with forested lands was putting its house in order and making definite provision to stop the depletion of timber by fire, to replant where necessary, and in time to commence some definite policy of management.

While our society, during this period, increased in number and devoted much time to the discussion of technical matters at its annual meetings, indeed promoting or assisting in the promotion of some of them, it did not establish its roots deeply. The only service it offered its members was the annual meeting which up to 1929 was always held in the East and could be attended by a relatively small number of members; it lacked the machinery by which all members could take an active and sustained part in its program.

Forestry Chronicle

One facet of this problem was the lack of some means of keeping members informed of each other's activities, of important forestry developments taking place in different parts of the country and of providing a record of technical papers given at the annual meetings. Various means had been tried. For a time a section had been set aside in the *Canadian Forestry Journal* for the use of the society and later in its successor *Forest and Outdoors*; a news bulletin had been issued from time to time. Furthermore, from the beginning members received as part of their subscription, first the American *Forestry Quarterly* and later its successor the *Journal of Forestry*, but in neither case did these contain much news of the Canadian Society or give complete publication of its annual meeting papers.

By 1925 a committee had been instructed to see what could be done to improve the situation and contrary to all normal procedure and experience the first issue of the *Forestry Chronicle* appeared in mimeographed form before the committee had submitted its report. The circumstances leading up to this, as related by A. H. Richardson, at that time secretary of the society, are rather interesting:

"I found that I was expected to issue from time to time a newsletter of a few pages containing items of a personal nature as well as society affairs; also it had been necessary to send out from time to time articles of members which fell in a class between being popular enough for *Forest and Outdoors* and not of sufficient general interest for the *Journal of Forestry*. Instead of sending these out as they came along I decided to save them up for two or three months, place them in an inexpensive binder and mail them out in a booklet form. When this was done the material contained could hardly be called a newsletter so the name *Forestry Chronicle* was given." With a note below the title "Issued from time to time for the members of the C.S.F.E."

By 1927 the *Chronicle* was being issued quarterly as a printed publication and all papers given at the annual meetings were being published therein.

Despite this development, the change in the economic climate of the country after 1930 further em-

phasized the lack of depth or breadth in membership interest and participation to which reference has already been made, and it was during the years of the depression, beginning indeed about 1928, that the society went through a period of critical self-appraisal, in the process of which it hammered out a pattern of decentralization to meet both regional and technical requirements which, I think you will agree, has proved highly effective.

The basic problem had of course been recognized in a general way from the beginning, having in mind the size of the country and the wide variation in the forestry conditions and problems from one part to another.

In 1913 four district executive committees were established representing Quebec and the Maritime Provinces, Ontario, the Prairie Provinces, and British Columbia. However, these were intended in the main to survey and report each year to central executive on regional forestry developments; they were not intended as a means for developing local programs.

Sections Organized

The idea of sections was discussed as early as 1915 and a committee was appointed at that time to draft regulations permitting their organization. However nothing further was done until 1929 when, following a request from the foresters of British Columbia, the constitution was amended to provide for the establishment of sections within the administrative framework of the society. It was suggested at the time that sections might be formed in the Prairie Provinces, northern Ontario, southern Ontario, Quebec, and the Maritime Provinces as well as British Columbia where in fact a section had been functioning unofficially for two years. However, with the exception of British Columbia little real use was made of this opportunity until 1937 when a policy committee appointed to investigate the situation recommended, largely on the basis of a submission made by the New Brunswick foresters, that certain changes be made in the constitution aimed primarily at encouraging the formation of sections and the development of local programs and the re-constituting of the board of directors to insure that its membership was based on section representation.

A second parallel problem was that of promoting greater participation of members in the technical program of the society. In 1928, B. F. Avery, at that time president, initiated a project requiring individual members to prepare reports on the progress that was being made in various branches of forestry across the country, the purpose being to have society "act as a clearing house upon the subjects assigned to individuals and to endeavour to stimulate interest in these subjects on the part of other members." Reports were to be prepared annually and published.

This concept and that of a national research committee of the society, which had first been proposed in 1920, were combined in 1936 with the formation of a coordinating research committee and sub-committees representing the main branches of forestry, each of which was to report annually on developments in its respective field. These sub-committees were re-constituted as separate standing research committees in 1945, and in 1950 as the standing technical committees we have today.

The publication of the *Chronicle* and the formation of sections and technical committees are all significant forward steps in our history but none of them came about either easily or quickly. Thus Mr. Richardson after two years as editor of the *Chronicle* likened his mailbox to the cupboard of Old Mother Hubbard, few articles being received without repeated solicitation. Happily, our present editor does not have this problem to contend with.

With these developments the society became stronger and far better able to accept its responsibilities at the level to which it had grown. Perhaps the best evidence of this was the preparation and publication in 1941 of the Statement of Forest Policy. This document was significant both in its content and in the fact that it was produced by and had the support of the forestry profession across the country. It received wide and generally favorable comment, was the forerunner of statements of forest policy by other organizations, and was undoubtedly useful to and used by those responsible subsequently for developing basic forest legislation in this country.

The society also proved its value at the national level during the World War II both in the evaluation it made of opportunities for postwar rehabilitation in the broad field of forestry and in its studies of the significance of the forest resource in any reconstruction or revaluation of this country's economy.

The Postwar Years

The postwar era has been one of spectacular economic development in Canada, based to a large extent on the interplay of applied science and resource development. Running parallel with this has been an increasing concern among many of our leaders in science, industry, and politics as to just what makes the machinery go and what steps should be taken to insure that it does not run down. Conferences have been held, such as the Westinghouse Conference in Quebec in 1953 and the Natural Resources Conference in 1954, surveys have been carried out and Royal and other commissions have been appointed to study among other things how best we may manage our available resources in order to insure our future prosperity.

The forest resource has been subject to intensive study from coast to coast, and in this connection the Institute has played a very important role at both the national and regional levels in submitting to investigating bodies carefully prepared briefs that have the authority and experience of the profession behind them. That the institute has a continuing rather than

superficial interest in these matters is clear from the program of the present annual meeting.

In conclusion I emphasize one point which I think would stand out in the mind of anyone reviewing the history of our society; that is, the tremendous contribution that has been made by a few of our members in carrying on the duties of secretary-treasurer and editor of the *Chronicle* over the years, a contribution to the society and institute for which the recompense has been nominal and recognition slight. We owe these men a great deal for our very existence and whatever progress we have made.

Indeed, beginning with those responsible for founding our society there have been leaders throughout the years with vision and energy who, with an ever increasing support of the membership at large, have welded our organization into something which is truly national and truly professional and which has the essential ingredients to meet its responsibilities in the future. Our history has been brief but important. This idea is well expressed in the following words:

"The past of other continents is a mine of fossil facts; here in Canada our past is more recent; other nations are proud of the history that goes back to the night of time; we belong to the sunrise but our little past is just as vital to our present as is their great past."

This, I suggest, is just as applicable to our society as to our country.

Measurement of Interest in Forestry

John A. Hornaday

IT HAS BEEN known for some time that people in specific occupations usually have characteristic preferences that distinguish them from a large portion of the rest of the working population. More recently, studies of certain jobs have revealed that a worker's preferences among well-known activities are related to the satisfaction he gets from his work and to the length of time he is likely to stay on a specific job. There is also some evidence that interest is related to achievement.

These findings are not surprising; there is general agreement that direction of motivation is important in both accomplishment and adjustment. It is entirely reasonable to suppose that the use of appropriate measures of interests in selection and placement can contribute to reduced turnover and increased efficiency. The evidence available merely reinforces the opinions already held by many personnel specialists. Under the circumstances, it may seem strange that more work has not been done on developing interest scales or keys for specific jobs.[1, 2] The need for such keys is clearly recognized.

With the cooperation of the Society of American Foresters, an occupational interest scale has been recently developed for foresters. Over 300 members of the Society completed a form of 100 preference items, and their responses to each item were compared with the responses of a base group composed of men in a wide variety of occupations. From the hundred original items, 44 items, which differentiated the occupational group of foresters from the base group, were included in the foresters' scale or key.

A separate group of foresters' forms were then scored according to the newly devised key, and their average score is 52.60 with a standard deviation of 5.11. In like manner, the key was applied to the base group, whose average score is 42.14 with a standard deviation of 6.68. The foresters' scores cluster at the upper end, and the base group's scores cluster at the lower end of the scale.

The distributions of scores for foresters and base group overlap at a point which lies between scores 47 and 48. This means that, if all scores of 48 and above are considered favorable and all scores of 47 and below are considered unfavorable, then 84 percent of the foresters' scores and only 17 percent of the base group's scores lie in the favorable range. On the other hand, 83 percent of the base group's scores and only 16 percent of the foresters' scores lie in the unfavorable range. The scale thus differentiates foresters from men in general; and, for this reason, it holds considerable promise for helping young people discover whether or not forestry is an appropriate occupation for them to consider. It should be emphatically pointed out, however, that measured interests are only one of several factors upon which young people should base their vocational goals. A trained guidance counselor, either at the high school or the college level, would administer the items to young people who are not clear as to what occupation they want to prepare for or who think they might enjoy following forestry as

THE AUTHOR is assistant editor, *Personnel Psychology*, Greensboro, North Carolina.

[1] Bourdo, Eric A., Jr. The interests of forestry students. Educational and Psychological Measurement 14:680-686. 1954.

[2] Brody, David S. Kuder interest patterns of professional forest service men. Educational and Psychological Measurement 17:599-605. 1957.

a career but want verification of their interest in that line. The guidance technician uses not only preference tests but also aptitude tests, personality tests, and other techniques designed to determine the suitability of the student for the job; and he makes recommendations to the student accordingly.

A specific illustration will clarify the practical significance of the foresters' scale. John is a high school or college student, anxiously struggling to choose an occupation appropriate to his interests, aptitudes, and special abilities. Under guidance, he completes interviews and several tests, among them the Kuder Preference Record—Occupational[3] which is the test that includes the forester scale discussed here. It is one of about 40 occupational scales that are a part of that test. The forestry scale is applied to the student's form. If John's score is 48 or above he has a good indication that he likes the same kinds of activities that 84 percent of foresters like. In other words, his interests more closely resemble the interests of foresters than they resemble the interests of men in the base group. If, however, his score falls at or below 47, then he knows that his interests are not similar to foresters; and he might be steered away from forestry as an occupational choice.

The forestry key has also been applied to samples of 100 members of each of a number of occupational groups. The average scores of these various groups are as follows:

Meteorologists	46.64
County Agricultural Agents	46.14
Farmers	45.79
Physicians	42.30
Realtors	40.53
Newspaper Editors	40.31
Newspaper Reporters	40.28
Professors of Psychology	39.68
Pharmaceutical Salesmen	39.43
YMCA Secretaries	38.30
Clinical Psychologists	38.29
Industrial Psychologists	37.71
Personnel Managers	37.54
Ministers	37.17
Department Store Salesmen	36.20

One might infer from this that foresters have a good deal in common with meteorologists, county agricultural agents, and farmers, and relatively little in common with department store salesmen, ministers, and personnel managers.

It might be of some interest to apply the key to some groups of women. The averages obtained from five groups of 100 each are as follows:

Nurses	37.51
Sample of women from many occupations	36.28
Clinical Psychologists	35.95
Housewives	35.21
Saleswomen	32.60

Here, again, salespeople are at the bottom of the list, although the women's scores are grouped closely together in any case. Out of the total of 500 women, only five (one percent) obtained scores of 48 or more.

These early findings from the newly developed foresters' scale indicate that the scale can provide young people with one reasonable basis for deciding whether or not to seriously consider forestry as a career. In its present form, the Occupational Preference Record serves as a valuable guidance tool; still further research is being done to expand its usefulness.

[3]Kuder, G. Frederic. Manual for Kuder Preference Record Occupational Form D. Chicago: Science Research Associates. 1956.

Forestry Section Southern Agricultural Workers to Meet

The Forestry Section of the Association of Southern Agricultural Workers will hold its annual meeting at the Peabody Hotel in Memphis, Tennessee, February 2-3. Chairman of this Section, Professor J. Reid Parker of the University of Georgia School of Forestry, points out that the ASAW is a large organization of technical and professional workers in agriculture, forestry and related fields. The Association is open to everyone and in the past has attracted a large attendance from all over the South.

The program of the Forestry Section is to be devoted to problems of small forest ownership, hardwood management, and future developments of southern forestry. Highlighting the program is a luncheon address by Mr. W. Jeter Eason, vice-president of Nickey Brothers, Inc., and president of the Forest Products Research Society. Following the luncheon there will be a conducted tour of the Memphis hardwood mill of Nickey Brothers, Inc.

How Much Land Is Needed for the Logging Transport System?

Wilfred C. Mitchell
and G. R. Trimble, Jr.

WHEN A TRACT of forest land is logged, a part of the area is necessarily devoted to transporting the product. In the eastern United States, some of the forest area is used for logging roads and trails and skidways or decking areas.

Under the old clearcutting methods, most such roads and log decks reverted to forest after the logging was finished. But under sustained-yield forestry methods, where cutting operations are carried out at shorter intervals and where fire protection requires passable roads, a permanent transport system is needed.

When an area is put under management, and a permanent road system is planned, these are some of the questions that arise: What mileage of road will it be necessary to build and maintain? What is the potential mileage of road, or area of land, that may need to be considered for after-logging erosion control? Will an appreciable area be withdrawn from forest production and used for a transport system?

Information to answer these questions has been gathered for a number of western logging operations (*1*, *2*, *4*, *5*, *6*) In all but one of these studies, the data indicate that at least 10 percent of the areas was used for tractor and truck roads and landings. In some cases the percentage of severe disturbance was over 20 percent.

For eastern conditions, information on the area of disturbance is scanty. One study made in southern Illinois showed that 17 percent of the area was disturbed by bunching and skidding with crawler tractors in a heavy partial cutting of upland hardwoods when material was removed in log lengths (*3*). However, in another area, where a lighter cut was made and the material was removed in tree lengths, only 10 percent of the area was disturbed. If "bunching" disturbance is excluded, the figures quoted above become for skidding alone 8 and 2 percent respectively.

The figures presented in this report are representative for one method of logging in the rough mountain country of West Virginia. They should apply in general to the Appalachian area.

For 10 years, logging for sawlogs has been carried out on small compartments—30 to 180 acres—on the Fernow Experimental Forest near Parsons, West Virginia. The same type of logging equipment has been used on all compartments. Skidding is done with a TD-9 International tractor employing a Karry-Kart logging arch; full-length trees are skidded to a deck for bucking (Fig. 1). Subsequent log transportation is by truck.

Permanent tractor roads are bulldozed in the compartments, and trees are winched from the stump to these roads, using 200 feet of cable. At times, cable is lengthened to as much as 400 feet. Maximum skidding distance from stump to deck is a little over a mile; average distance is considerably less. Average skid load is approximately 1,300 board feet.

The terrain in these compartments is roughly comparable; each compartment is a steep mountain hollow.

Data on the areas devoted to skidroads are available for 13 of these compartments. These are classified in two groups: compartments where the roads were located by foresters, and compartments where the loggers laid out the roads as they wished. The two

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FIG. 1.—Tree-length skidding on a skidroad with a 10-percent grade.

classes of skidroad layout may be characterized as follows:

Located by foresters.—The entire layout for a compartment was carefully planned in advance for maximum efficiency (minimum mean length of road per acre) consistent with the specification that grades, except for occasional very short stretches, should not exceed 20 percent.

Located by loggers.—Roads laid out with little or no advance planning for efficiency, and with no limitations on grade except those imposed by the topography and by capability of the skidding equipment to function.

In practice, the planned road systems laid out by foresters definitely did average less length of skidroad per acre, with gentler grades, than those laid out by loggers (Table 1). The planned roads meant more economical logging and fewer erosion and sedimentation problems.

But not all the area taken up in logging these compartments was in skidroads. Log decks and truck roads also occupied some of the land. The proportion of the areas in these last two categories was determined by the chance location of the compartment with respect to the main road system, by topographic factors, and by compartment size—not by any difference in road standards. For this reason, data on the amount of land occupied by truck roads and log decks were averaged for all 13 compartments. On the basis of this averaging, truck roads occupied 0.9 percent of the area and log decks 0.6 percent.

It is interesting to compare the arch logging system used on the Fernow compartments with a typical horse-logging job (clearcutting) in similar terrain.

On this horse-logging job, steep skid trails were run from the top of the mountain to the truck road below, where the logs were loaded (Fig. 2). Skid trails averaged 6 feet in width. Average distance between trails was 44 feet. Average grade of the trails was 51 percent.

On this job, severe disturbance in skid trails covered 12 percent of the forest area. In contrast, the truck road covered 0.5 percent.

Three general conclusions may be drawn from these data:

First, the road systems, both planned and loggers' choice, as developed on the Fernow for skidding with tractor and arch, result in less area permanently disturbed than with typical West Virginia methods of horse logging, and less than in many western ground-logging operations, where disturbances of 10 percent or more of the area are reported to be common.

Second, with the system used on the Fernow Forest, most of the area disturbed by logging is limited to the skidroads.

And third, with the Fernow system, by carefully planning the use of the land in logging, the area in skidroads can be reduced about 40 percent.

TABLE 1.—FOREST AREA USED FOR SKIDROADS IN LOGGING STUDIES ON THE FERNOW EXPERIMENTAL FOREST

Compartment no. and area		Length[1] of skidroad per acre	Percent of total area	Average grade of road
	Acres	*Chains*	*Percent*	*Percent*
		LOGGER'S ROAD SYSTEM		
1	27	5.1	7.0	21
2	74	3.7	5.0	17
3	166	3.5	4.8	14
4	78	4.4	6.0	24
5	53	4.0	5.5	16
		ROAD SYSTEM PLANNED BY FORESTERS		
6	180	1.9	2.6	11
7	77	2.6	3.5	15
8	46	3.4	4.6	15
9	31	1.8	2.5	13
10	116	2.0	2.7	12
11	43	3.2	4.4	9
12	116	3.1	4.2	10
13	59	2.8	3.8	14

[1]Width of road is approximately 9 feet. This is the area of serious soil disturbance—gouging and compaction. Slight soil disturbance was not included.

Literature Cited

1. GARRISON, GEORGE A., and ROBERT S. ROMMELL. 1951. First-year effects of logging on ponderosa pine forest range lands of Oregon and Washington. Jour. Forestry 49:708-713.
2. GJERTSON, J. O. 1949. Practical guides for seeding grass on skid roads, trails, and landings, following logging on east-side forests of Washington and Oregon. U. S. Forest Serv. Pa-

FIG. 2.—Results of a typical horse-logging job in West Virginia hardwoods. Each skid trail is a potential erosion problem.

cific Northwest Forest and Range Expt. Sta. Res. Note 49. 5 pp.
3. HERRICK, DAVID E., and GLENN H. DEITCHMAN. 1956. Effect of tractor logging upon hardwood stands. Forest Prod. Jour. 6:403-408.
4. HORMAY, A. L. 1940. The effect of logging on forage. Chron. Brit. 6:6-7.
5. STEINBRENNER, E. C., and S. P. GESSEL. 1955. Effect of tractor logging on soils and regeneration in the Douglas-fir region of southwestern Washington. Soc. Amer. Foresters Proc. 1955:77-80.
6. RAPRAEGER, HAROLD A. 1947. The change in the fire hazard on partially cut logging areas. Timberman 48:50, 52.

Vegetation Storage on the Watershed

Donald R. Satterlund

IN THE LITERATURE of forestry much has been written on the influence of forests on streamflow. From the beginning, a major concern has been the depletion of soil moisture by the transpiring forest. Following precipitation, in the absence of surface runoff, this soil moisture deficit must be replaced before any significant contribution of water to streamflow can take place. Thus the retention storage capacity of the forest soil at any given time has always been an important element in forest influences research.

Efforts to measure precisely the storage factor in the water cycle have included studies of depression storage on the soil surface and the storage capacity of forest litter as well as variations in ground water levels and soil moisture conditions. At the same time, hydrologists and foresters alike have largely ignored the variations in moisture content of forest trees. These variations may create appreciable water storage capacities which likewise are filled at the expense of streamflow. It is the purpose of this paper to examine and discuss the significance of such vegetation storage.

Internal Water Balance in Trees

Forest tree physiologists have long recognized that the moisture content in the wood of living trees may vary, diurnally and from season to season (*1, 10*). Diurnal variations have been detected in dendrometer studies of shrinkage and swelling of woody stems (*6, 10*) and have been measured by simultaneously measuring transpiration and absorption in living trees (*9*). Seasonal variations have been measured by periodic sampling of the moisture content of wood taken from living trees (*1, 2, 3, 5, 8, 13, 16*) as well as being detected in dendrometer studies. While dendrometer studies yield no quantitative information on moisture content, they do help to verify the occurrence of variations in many species.

Diurnal decreases in the moisture content of living trees are due to transpiration losses at rates which exceed the absorptive capacity of tree roots during the daylight hours, thus depleting moisture storage in the tree. At night, when the tree is well watered, absorption of moisture by roots takes place at a more rapid rate than transpiration, replenishing the internal moisture supply as demonstrated by Kramer (*9*). Various investigators have suggested that seasonal variations in moisture content result when the soil begins to dry and the balance between moisture losses and absorption cannot be maintained in spite of very low night transpiration rates (*1, 6, 9, 10*).

Seasonal variations in moisture content have been measured by several investigators in native and European species, both broad leaved and coniferous. Generally, high moisture contents occur in the spring near the beginning of the period of leafing out and are lowest at or shortly after the period of leaf fall in autumn. After leaf fall the moisture content rises, but some species may exhibit another drop with the onset of winter, resulting in a secondary minimum in early spring. The fall in moisture content in winter may well represent transpiration losses which cannot be replaced when the soil or tree stem is frozen. This general pattern of moisture content may vary with weather conditions (*6, 13*) and and with species.

Of the hardwoods, birches (*Betula* spp.) show a maximum water content just before leaf opening and a minimum at leaf fall, with a partial refilling in autumn and a secondary minimum just before the soil thaws. The poplars (*Populus* spp.) are similar, except that they may exhibit a complete refilling in the fall. American elm (*Ulmus americana* L.) and white ash (*Fraxinus americana* L.) have a similar summer pattern, but do not refill in autumn, remaining relatively dry throughout the winter. American beech (*Fagus grandifolia* Ehrh.) proved unique in that it had a high moisture content in winter and a minimum in summer (*5*). European beech (*F. sylvantica* L.), however, exhibited two maximums and minimums similar to the birches, while European oak (*Quercus* spp.) was similar to American elm and white ash in this respect (*1*).

For conifers a similar situation exists. In Europe, pine (*Pinus sylvestris* L.) and spruce (*Picea abies* [L.] Karst.) show a typical bimo-

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dal pattern (*1*), as does Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco) and Sitka spruce (*Picea sitchensis* [Bong.] Carr.) in Great Britain (*2*). In North America a less distinct pattern of variation, as well as a lower amplitude, was shown in Douglas-fir and ponderosa pine (*Pinus ponderosa* Laws) (*13*). The moisture content of eastern hemlock (*Tsuga canadensis* [L.] Carr.) is high in midwinter, low in late spring, and high in early summer with a secondary low at the end of summer. Jack pine (*Pinus banksiana Lamb.*), white spruce (*Picea glauca* [Moench] Voss) and balsam fir (*Abies balsamea* [L.] Mill.) showed irregular and slight variations (*5*).

Several investigators state that the moisture content varies only in the sapwood of ring-porous hardwoods (*7*) and resinous conifers (*2, 3*), but measurements in hickory (*Carya* spp.) (*16*) and ponderosa pine (*13*) indicate that such may not always be the case.

Quantitative Assessment of Vegetation Storage

The difference in moisture content of a tree between the spring and early summer high and the autumnal low may be considerable. A difference of up to 42 percent, oven dry weight, is reported for yellow birch (*Betula alleghaniensis* Britton) (*3*). It is of interest to analyze the amount of vegetation storage which may be made available by these internal moisture variations in the wood of forest trees.

Where yield tables are available giving the volumes of various species in cubic feet per acre, vegetation storage capacities expressed in inches depth over the watershed may be determined for any species by the formula:

$$d = \frac{12 \cdot (M_1 - M_2) \cdot S_g \cdot Y}{43{,}560}$$

where d = inches depth of water, M_1 = the maximum moisture content in percent oven dry weight of the wood, M_2 = the minimum moisture content in percent oven dry weight, S_g = the mean specific gravity of the wood, and Y = total wood volume of the stand in cubic feet per acre.

Since few yield or volume tables are constructed to give total volume of both stem and branchwood, the volumes as given must be adjusted to include branchwood. Fortunately, studies in forest nutrition have provided a guide as to the relative proportion of stem and branchwood for a wide range of species, which may be used to provide an approximation in adjusting yield tables. For pines, branchwood constitutes about 14 percent of total volume, in other conifers about 12 percent, and in hardwoods about 21 percent (*15*). Where hardwood yield tables give volumes only to a 5 inch top d.i.b., a proportion of 25 percent is used.

For species such as Douglas-fir, in which variations in moisture content occur almost entirely in the sapwood, a further problem of determining sapwood volume arises. It has been shown for several coniferous species that the quantity of sapwood in a tree is related to the quantity of foliage produced. The proportion of sapwood to total volume decreases with site quality, on mature stands of Scots pine at 110 years ranging from about 65 to 70 percent on medium and poor sites to about 55 percent on good sites (*1*). It is therefore, possible to approximate sapwood volumes from yield table data. In this paper a conservative figure of 40 percent is used for age 100 on good sites and 50 percent on poor sites.

The accompanying table presents the vegetation storage capacity possible in several species at the end of the sumer season over a range of ages and sites, as determined by the formula with the above mentioned modifications in yield table data.

Discussion

It is readily apparent from an examination of the table that an appreciable vegetation storage capacity may exist on many forested watersheds. It must be pointed out, however, that the figures given are at best approximations. In very few cases have measurements of the moisture content of the wood in living trees been carried out with sufficient frequency to insure measurement of the entire range of variation which may occur. For this reason the calculated quantities of storage are possibly low in some cases.

The information presented, how-

TABLE 1.—CALCULATED VEGETATION STORAGE CAPACITIES OF WELL STOCKED STANDS BY AGE AND SITE QUALITY

Species	Moisture content Percent oven dry weight Max.	Min.	Diff.	Specific gravity	Yield from yield tables Age	Site	Volume Cu. ft/acre	Adjusted volume[1] Cu. ft/acre	Water storage capacity Cu. ft/acre	Inches
Yellow birch	92	50	42 (*3*)	0.70 (*14*)	200	Good	5,000 (*4*)	6,700	1,940	0.54
					200	Poor	3,020	4,040	1,180	0.33
					80	Good	2,770	3,700	1,085	0.30
					80	Poor	1,030	1,290	380	0.10
Beech			20+ (*8*)	0.75 (*14*)	200	Good	5,000 (*4*)	6,700	1,000	0.28
					80	Poor	1,030	1,290	194	0.05
Ponderosa pine	130	110	20 (*13*)	0.50 (*14*)	100	150	17,200 (*12*)	20,000	2,000	0.55
					100	50	3,400	3,960	396	0.11
					200	100	10,950	12,700	1,270	0.35
					200	50	4,850	5,650	565	0.16
Douglas-fir (Sapwood only)	160	95	65 (*2*)	0.50 (*14*)	100	I	19,820 (*11*)	9,030[2]	2,930	0.81
					100	V	6,400	3,640[3]	1,180	0.33

[1]Total volume of yield table, plus branchwood.
[2]Total volume of yield table, plus branchwood times 0.40.
[3]Total volume of yield table, plus branchwood times 0.50.

ever, is sufficient to point out that vegetation storage may be an appreciable element in forest influences research, if for no other reason than that it exists in measurable quantity. Its effect is to increase the moisture storage capacity of forested watersheds in a form available for transpiration and hence decrease the amount of water available for streamflow. Vegetation storage is effective wherever the hydrologic depth of the soil is limited by factors other than lack of precipitation.

Such knowledge may well be of practical importance in the West where water values are high and timber values and water yields are low. Wherever the retention storage capacity of the soil is satisfied annually, increases in streamflow due to timber cutting can result from the decreased storage capacity of the watershed as well as from decreased interception and transpiration. The amount so yielded will be commensurate with the extent of reduction of the vegetative storage capacity.

On dry areas with deep soils, where the hydrologic soil depth is limited by scanty precipitation no such result could be expected. The decrease in vegetation storage due to cutting would be offset by deeper soil moisture storage.

On the other hand in the northeastern United States where many forested areas are characterized by extremely thin soils, as in New England and New York, the vegetation storage capacity on the watershed may be as much as 20 percent of the soil retention storage capacity during autumn. In this area, and wherever frozen soils are typical during the winter months, an additional storage capacity is created during this time in those species that exhibit a bimodal pattern of internal moisture content, requiring additional moisture to bring storage levels up from the early spring low to the late spring high.

Thus it may be seen that vegetation storage may be appreciable in an analysis of the water cycle. On areas of poor stocking, very young forests, on extremely poor sites or with species of low storage capacity, vegetation storage would be slight. In well-stocked mature stands of species with high storage capacities on good sites, vegetation storage can be of considerable importance.

At this time, however, sufficient data are lacking with which it would be possible to define precisely the importance of vegetation storage on a given watershed. For example, it is not possible to assess the storage capacity for many of the important forest species in the United States due to the lack of information concerning seasonal variations in their moisture contents. Watershed managers and hydrologists would do well to investigate further this element of the water cycle.

Literature Cited

1. BÜSGEN, M., and E. MÜNCH. 1929. The structure and life of forest trees. 3rd edition. (English translation by T. Thompson). John Wiley and Sons. New York. 436 pp.
2. CHALK, L., and J. M. BIGG. 1956. Moisture in Douglas fir and Sitka spruce. Forestry 29:5-21.
3. CLARK, J., and R. D. GIBBS. 1957. Studies in tree physiology. IV. Further investigations of seasonal changes in the moisture content of certain Canadian forest trees. Can. Jour. Bot. 35:219-253.
4. GEVORKIANTZ, S. R., and W. A. DUERR. 1937. A yield table for northern hardwoods in the Lake States. Jour. Forestry 35:340-343.
5. GIBBS, R. D. 1950. Seasonal changes in water contents of trees. Proc. 7th Int. Bot. Congr. 230-231.
6. HAASIS, F. W. 1932. Seasonal shrinkage of Monterey pine and redwood trees. Plant Physiol. 7:285-295.
7. HUBER, B. 1952. Tree physiology. Ann. Rev. Plant Physiol. 3:333-346.
8. JANICZEK, M., and E. BOBROWICZ. 1952. Distribution of moisture content in green wood of *Fagus sylvatica* growing in Pomorze and the Carpathians. Prace Inst. Bad. Lesn. No. 78. 44 pp. (Seen in For. Abstracts 14 (3) No. 2622).
9. KRAMER, P. J. 1937 The relation between rate of transpiration and rate of absorption of water in plants. Am. Jour. Bot. 24:10-15.
10. MACDOUGAL, D. T. 1925. Reversible variations in volume, pressure and movements of sap in trees. Carnegie Inst. Wash. Publ. 365.
11. MCARDLE, R. E., and W. H. MEYER. 1949. The yield of Douglas fir in the Pacific northwest. U.S. Dept. Agric. Tech. Bul. 201 (revised).
12. MEYER, W. H. 1938. Yield of even-aged stands of ponderosa pine. U.S. Dept. Agric. Tech. Bul. 630.
13. PARKER, J. 1954. Available water in stems of some Rocky mountain conifers. Bot. Gaz. 115:380-385.
14. RECORD, S. J. 1934. Identification of the timbers of temperate North America. John Wiley and Sons. New York. 196 pp.
15. RENNIE, P. J. 1955. The uptake of nutrients by mature forest growth. Plant and Soil VII, 1:72-73.
16. SMITH, W. R., and N. B. GOEBEL. 1952. The moisture content of green hickory. Jour. Forestry 50:616-618.

Ecological Changes in the Ponderosa Pine Forest of the Warm Springs Indian Reservation in Oregon[1]

Harold Weaver

SINCE PIONEER DAYS there have been profound ecological changes in the ponderosa pine (*Pinus ponderosa*) forest on the east slope of the Cascade Range on the Warm Springs Indian Reservation in Wasco and Jefferson counties, Oregon. Over extensive areas pine reproduction thickets have developed in such density that growth has become stagnated. Even more extensive areas, under the mature pines, have become monopolized by dense reproduction thickets of associated Douglas-fir (*Pseudotsuga menziesii*), incense cedar (*Libocedrus decurrens*), and white fir (*Abies concolor* and *A. grandis*) and by various shrubs. This dense understory reproduction and brush stand has adversely affected growth rate and vigor of the overstory pines, through competition for the limited soil moisture. Fire hazard has increased tremendously.

These adverse changes are typical of similar changes that are occurring over even more extensive portions of the Ponderosa Pine Region. The writer has already presented detailed evidence that fire was an important ecological factor in the primeval ponderosa pine forest. He also has presented evidence that the adverse changes have resulted largely because of early day over-grazing by domestic stock and by attempts at total fire exclusion. Finally he has advocated prescribed burning as one of the silvicultural tools that may be used to correct presently adverse conditions and has presented results of some of the prescribed burning tests that have been conducted (*2,3,4,5,6,7*).

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[1]This article represents the author's views and is not to be regarded as an official expression of the attitude of the Bureau of Indian Affairs on the subject discussed.

The writer's interest in studying fire as an ecological factor and in its possible use as a silvicultural tool was greatly stimulated by changes following a fire that burned on the reservation in 1938. He helped control the fire and observed conditions for several years thereafter. It caused great damage on some of the canyon slopes. On more extensive tablelands, however, it appeared that results were in general beneficial. The fire almost completely consumed many thousands of snags and windfalls caused by a severe epidemic of the western pine beetle (*Dendroctonus brevicomis*). It deadened dense understory bitterbrush (*Purshia tridentata*). In many reproduction thickets, dominant saplings and poles still survived in sufficient numbers to comprise a fairly well stocked stand. Where thinning was too severe, there developed subsequent ponderosa pine reproduction. Larger trees, after recovery from severe scorching, appeared to improve in vigor.

More recent observations indicate that on areas where fire has been excluded reproduction thickets of ponderosa pine have continued very poor growth, in spite of greatly improved moisture for the past 17 years. Brush is considerably higher and denser. Reproduction of associated species, particularly Douglas-fir, has developed considerably, both in height and density. Vigor of the overstory pines has continued to decline. Hazard has continued to increase and several recent fires, though promptly controlled, have devastated the areas covered.

Conditions within the 1938 burn present extreme contrasts to those above described. The ground is still comparatively free of fuel accumulations and of brush and in general aspect appears grassy and parklike. Well spaced pine reproduction is making excellent growth despite poor site conditions, and nearly all of the openings appear adequately stocked. Overstory trees, in general, appear healthy and vigorous, with long, dark green needles.

These changes within the burned area, as contrasted to changes on unburned areas, confirm the continuing importance of fire as an ecological factor in the ponderosa pine forest. The writer's purpose is to trace changes inside of and outside of the burn in more detail, to illustrate them by means of photographs and to present his conclusions regarding appropriate remedial action needed.

Conditions in Earlier Days

That fires occurred frequently in earlier days is indicated by the record of the basal fire scars that are abundant throughout the ponderosa pine stands. Data from four fire-scarred stump sections of pine, selected at random on widely separated areas on the Warm Springs Indian Reservation, are presented in Table 1.

The first section was cut on the South Fork of the Warm Springs River. This is near the upper limit of ponderosa pine occurrence in the mixed pine-fir type. Because of generally more favorable moisture conditions, fires occurred at less frequent intervals on such areas. When they did occur, however, they sometimes burned with considerably more intensity than did the fires at lower elevations.

The second section was cut on Butte Creek, near the western boundary of the ponderosa pine type, while the third section was cut in the Simnasho Butte area, near the desert fringe of the type. For both sections it will be noted that while fires burned at frequent

TABLE 1.—FREQUENCY OF FIRES ON THE WARM SPRINGS INDIAN RESERVATION AS INDICATED BY FIRE SCARRED STUMP SECTIONS[1]

Area where cut	Total age	Date section was cut	Years during which fires burned	Number of fires	Ave. Int. between fires no. years
So. Fork of Warm Springs River T7S, R9E.WM	392	1957	1864, 1824, 1771, 1762, 1603, 1583	6	47
Butte Creek T6S, R10E	294	1957	1921, 1864, 1857, 1834, 1829, 1812, 1788, 1786, 1784, 1767, 1754, 1737, 1720, 1687	14	17
Simnasho Butte T6S, R11E	316	1957	1873, 1865, 1852, 1843, 1834, 1829, 1826, 1820, 1812, 1800, 1784, 1774, 1766, 1762, 1752, 1735, 1686, 1669	18	11
Twin Buttes T10S, R10E	510	1957	1906, 1891, 1874, 1857, 1842, 1837, 1824, 1806, 1800, 1773, 1740, 1732, 1720, 1691, 1667	15	16

[1]These sections were collected by the forestry staff of Warm Springs Indian Agency, under the supervision of Francis S. Van Sickle, forest manager.

intervals in earlier days, for some reason they burned at rarer intervals after the 1870's. These areas are near an old, established Indian settlement at Simnasho. It is possible that heavy grazing by horse herds and later by cattle and sheep may have tended to retard the spreading of fires.

The fourth section was cut near Twin Buttes in the central portion of the pine type. This area is more remote from Indian settlements. This may account for the regularity with which fires occurred until 1906.

Considerable intervals between fires, in the late 1600's and early 1700's, may possibly indicate a period of years of above average precipitation. There apparently is no similarity in fire dates between the various sections. It is believed that fires were widespread in 1910, yet none of the sections collected happen to record fire scars of this date.

Fred G. Plummer reported on conditions in the "Central Portion of Cascade Range Forest Reserve," in a government publication of 1903 (*1*). In discussing "Yellow Pine (*Pinus ponderosa*)" he stated that ". . . Its forests are generally open, without much litter or undergrowth, and for these reasons are almost immune from fire." In discussing "Underbrush" he reported that "In the yellow pine region bordering the timberless areas of eastern Oregon the forest is often as clean as if it had been cleared, and one may ride or even drive without hindrance. As the hills are approached the brush increases . . ." In discussing "Litter" he reported that "The litter is the graveyard of the forest and as such is a constant menace to the living trees. It is composed of the fallen limbs of living trees and the trunks and limbs of the dead ones lying as they fell upon the forest floor. In the late summer or fall the Western forest is a potential conflagration . . . The litter is at its minimum in the most easterly of the yellow pine areas, where there is only here and there a tree fallen from old age." For each township within the ponderosa pine type on the Warm Springs Indian Reservation he reported that "litter is light."

L. Von Wernsted in a "Report on the Warm Springs Indian Reservation" in 1906, indicated that "The yellow pine reproduction is uneven and on the whole poor on account of ground fires which have been frequent in the past. When there is reproduction in spots, it is, however, dense. There is very little underbrush in the lower country and but very little grass . . . with the foothills there is an increasing amount of chaparral undergrowth . . . Fires have been frequent in the past and there is hardly any area that does not show signs of old fires. In the yellow pine the effect has been mainly to keep down the reproduction while in the upper country the fires have been very destructive . . . There are 5,600 horses and 1,500 head of cattle owned by Indians. The range is in poor condition."

Mr. James G. Smith, an elderly member of the Warm Springs Tribe, recalls that as late as 1914 or 1915 it was possible to drive a wagon almost at will throughout most of the ponderosa pine type. He recalls that the Schoolie Pasture, along the Warm Springs River near the western edge of the type, was an important cattle camp. Each summer bands of sheep from home ranches near Prineville and Redmond were grazed on the reservation.

Conditions During the 1930's

By 1933, when the writer first became acquainted with the reservation, the ecological changes previously described were already well advanced. Dense clumps and thickets of pine reproduction were characteristic of the drier sites and lower elevations. With associated bitterbrush they were extensive on the tablelands of the Metolius and Tenino Benches in the southern part of the reservation. Northward they occupied a progressively narrower strip along the lower timber fringe.

Except as above noted, dense Douglas-fir reproduction comprised an almost universal understory over the timbered northern portion of the reservation. Further south, and west of the Tenino and Metolius Benches, cedar reproduction was predominant. Here, over limited areas, the forest still retained the open parklike appearance, so characteristic of earlier days (Fig. 1). Closer observation, however, usually revealed these places to be densely seeded to small cedars. With increasing elevation, manzanita (*Arctostaphylos parryana* var. *pinetorum*) and snowbrush (*Ceanothus velutinus*) replaced the bitterbrush. White fir reproduction was predominant at some of the higher elevations in the mixed pine-fir type.

The reproduction clumps and

FIG. 1.—Parts of the pine stand on the extensive western portions of Metolius Bench and Tenino Bench were still comparatively open and free of underbrush and reproduction when this photo was taken in December 1939 in Section 15, T10S R10E. Beetles were beginning to thin the stand by killing small groups of trees. Note windfalls. Also note small incense cedar seedlings.

FIG. 2.—This photo, taken in August 1957, is of the scene photographed 18 years previously in Figure 1. Note development of cedar and Douglas-fir reproduction. Note also that there appears little change in the windfalls.

thickets were laced by almost countless thousands of windfalls and snags of beetle killed pines. Losses were particularly severe at lower elevations. Beetle survey check sections on Metolius and Tenino Benches and on Miller Flat, for instance, revealed losses of from 22 to 29 percent of the merchantable stand over the period 1932-1940 inclusive. The surveys also revealed that for the entire reservation the beetles killed 325 million feet, board measure, of pine during the period 1930-1940 inclusive. Because of the thickets and beetle deadened pines it was no longer possible to drive almost at will through the forest.

Changes Caused by Fires

In 1930 a very destructive fire burned at higher elevations, largely in the mixed type. It crowned several thousand acres on the east and north slopes of North Butte. Considerable ponderosa pine reproduction developed on this area, but it was apparently engulfed and suppressed by dense manzanita and snowbrush.

Near Schoolie Pasture, in 1934, a smaller, less damaging fire deadened most of the Douglas-fir understory reproduction. Seed supply and seed bed conditions were such that this area restocked predominantly to ponderosa pine.

The 1938 fire, previously mentioned, burned more than 100,000 acres before it was controlled. Included were 20,000 acres of pine type, largely on the eastern portions of Tenino and Metolius Benches. A lush, early spring growth of cheatgrass (*Bromus tectorum*), followed by dry, hot, late spring and early summer weather set the stage for this fire. In early July, when temperatures in the woods registered as high as 105 degrees F, a violent but dry lightning storm set many fires, some of them in rugged canyons in juniper woodlands immediately below the pines. A high wind from the north, accompanied by continued hot weather, blew some of the fires out of control the second day. They spread with amazing speed. One traveled 8 miles in two hours to threaten the Warm Springs Agency. By the third day, despite the efforts of hundreds of fire fighters, the fires reached the Deschutes River along the reservation's eastern boundary, and the Metolius River and earlier grassland burns to the south. Then they advanced westward into the pine type on a 20 mile front.

Results of this big burn were as previously described. In addition its effect on the pine beetle epi-

FIG. 3.—Selectively logged area with reserved pines over dense Douglas-fir poles in understory. This photo was taken in August 1957, in Section 32, T7S, R10E. This typifies many thousands of acres that formerly were open, park-like pine stands.

FIG. 4.—This dominant pine pole in a reproduction thicket approximately one-half mile west of the 1938 burn, on Tenino Bench in Section 5, T10S, R11E, was 60 years of age when this photo was taken in October 1956. Though no nearby overstory pines were competing, it had attained a diameter outside bark at ground line of only 6 inches.

demic should be mentioned. Within the burn beetle activity intensified the following two years. Thereafter the beetles subsided to the normal or endemic status. They have remained thus ever since.

Present Conditions

Present conditions have also been briefly described. In the northern portion of the reservation on unburned areas the Douglas-fir and white fir reproduction has apparently increased by from 10 to as much as 20 feet in total height since the 1930's (Fig. 3). In selective logging of the overstory pines and Douglas-firs it is necessary for the skidding tractors to plow lanes through this dense pole stand. This has complicated slash disposal. Except on isolated areas it does not appear that the exposed skid trails have encouraged pine reproduction. Apparently the areas are too small and shaded and too much competition is provided by the predominant fir reproduction. In the reserve stand the previously vigorous pines are showing unmistakable evidence of increasing susceptibility to beetle attack.

In early September 1955, on a windy, dry afternoon, the Deadman Springs fire traveled 2 miles through this jungle in a period of three hours. Though the area burned was confined to slightly over 300 acres, it killed three million feet, board measure, of ponderosa pine and Douglas-fir timber.

Considerable changes have also occurred on areas where cedar reproduction is predominant, though it has not made the more rapid growth characteristic of Douglas-fir and white fir reproduction. One dominant, open grown sapling, 6 feet in height and 2 inches in diameter at the ground line, was found to be 45 years of age. There no longer is an open, parklike aspect to any unburned portion of the forest (Fig. 2).

The stagnating clumps and thickets of pine reproduction have made little observable change since the 1930's. Even in the midst of thick clumps considerably removed from overstory pines, growth has been exceedingly slow, in spite of favorable moisture of the past 17 years (Fig. 4).

The western pine beetles, though not as active as in the 1930's, have continued sporadic attacks and have caused continued loss. Currently the beetle population appears on the increase.

As indicated, conditions within the 1938 burn are in startling contrast to those above described. Growth on pine saplings and poles that survived the 1938 fire has been almost phenomenal (Figs. 5 and 6). Subsequent reproduction of pine also is well distributed and has made very rapid growth (Fig. 7). We observed one tree, originat-

FIG. 5.—This photo was taken in August 1957, of a portion of the area burned over by the great fire of July 1938, on Section 28, T9S, R11E. Note remains of fire-deadened pine poles littering ground. Despite poor site conditions (estimated at Site V), surviving poles are making excellent growth. Most of the reproduction clumps and thickets on burned portion of Tenino Bench were fire-thinned in such manner.

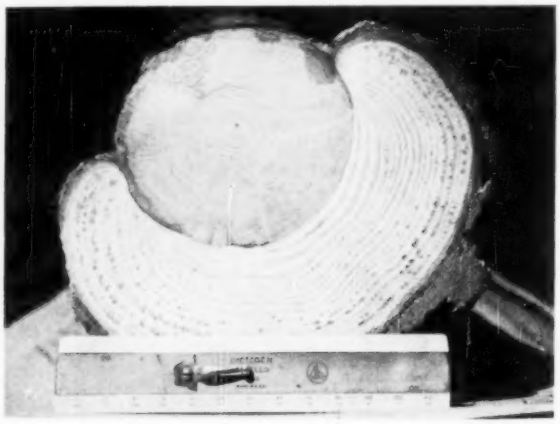

FIG. 6.—Section cut from near ground line of intermediate sized pole near extreme right foreground of Figure 7. For a number of years previous to 1938 burn, annual growth was almost microscopic. Immediately after the burn, however, the tree greatly accelerated in growth. This was in spite of being almost girdled by fire. Increment cores from less severely injured dominant and codominant trees showed even more pronounced growth acceleration.

ing subsequent to the burn, that is now almost 20 feet in height. Why the burn did not reseed to exceedingly dense, "dog hair" stands is a mystery we have not fathomed.

In spite of wild horses that range at will almost year long, much of the area is still grassy in general appearance. Sandberg's bluegrass (*Poa secunda*) is predominant.

On the North Butte burn of 1930, it should be noted, pine saplings and poles are overtopping the manzanita and snowbrush.

FIG. 7.—Pine reproduction that developed subsequent to 1938 burn on another portion of Section 28, T9S, R11E. Some of these trees are already larger than 60 year old dominants in thickets outside of burn to the west.

Discussion

The writer believes that the contrasting ecological changes described herein furnish proof that pines will grow if they are given adequate growing space and relative freedom from competition. Pole and sapling sized trees that survived the 1938 fire and that were released from competition, have made very rapid, accelerated growth, despite poor site conditions.

Conversely, conditions immediately outside of the 1938 burn, on identical sites, prove that pines will make very poor growth in crowded stands and when suffering severe competition from dense brush.

Competition from overstory trees adversely affects growth of understory reproduction stands. Conversely, the dense understory reproduction adversely affects growth of the overstory trees. This is proved by a study recently conducted by the forestry staff of Warm Springs Agency, with the advice and assistance of the Deschutes Research Center of the Pacific Northwest Forest and Range Experiment Station. This study indicates that during the past decade immature pines of Keen's class 2B inside the burn have been growing 66 percent faster than similar trees outside of the burn, immediately to the west. Thrifty mature trees of Keen's class 3B have been growing 23 percent faster than their counterparts outside of the burn. All trees were selected at random, both inside of and outside of the burn. Site conditions are uniform.

Anything that adversely affects the growth rate of mature pines renders them more susceptible to pine beetle attacks. Since the dense understory reproduction has adversely affected the overstory pines, it is reasonable to assume that it intensified effects of the pine beetle epidemic. It also explains continuing deterioration in health and vigor of the larger, high quality trees. Observations have indicated this for years.

Ponderosa pine is adapted to a condition of periodic fires. Also it is a fire-climax tree over much of its range on the Warm Springs Reservation. It is probable that the forest floor frequently seeded to Douglas-fir, white fir, and cedar in centuries past. Except for rare, fortunately situated individuals, these little trees never survived the periodic fires to grow to maturity. Now that the fires have largely been stopped, profound ecological changes herein described have resulted.

Results of the North Butte burn of 1930 indicate the manner in which ponderosa pine was perpetuated at higher elevations. Even-aged stands of immature pine are proof that burns similar to the North Butte fire have occurred during previous years. Such a stand originated following an extensive burn near Schoolie Pasture about 1880. This stand was again burned over and thinned by a fire in 1910.

Elsewhere over the reservation, overgrazing of earlier days doubtless has had considerable effects on the manner and density with which the reproduction stands have developed.

Conversion to a stand comprised predominantly of Douglas-fir, white fir, or incense cedar is inevitable over much of the reservation if present trends are permitted to continue. Some foresters believe that there is no disadvantage in this. Practically every overstory Douglas-fir, however, is heavily infected with mistletoe (*Arceuthobium douglasii*), which frequently causes mortality. It is reasonable to assume that the reproduction stand is also heavily infected. These low quality trees are occupying land where high quality pine makes its best growth. Incense cedar as a replacement for ponderosa pine, appears even less desirable. White fir, in contrast, is making rapid growth and appears more desirable than either of the other two associated species.

Douglas-fir and white fir reproduction have grown to such size that it is doubtful that prescribed burning can be successfully applied. It probably will be advisable to attempt to protect these stands until they reach pulpwood size. Then the stand can be harvested in two stages. Prelogging can harvest the pulpwood. The larger trees can later be harvested on a group selection basis and slash can be burned. Then, if desired, the land can be returned to pine reproduction.

It is doubtful that logging can be postponed until the poles reach pulpwood size. In fact present timber sale contractual obligations

assure that a considerable portion of the stand will be selectively logged. Additional sanitation-salvage logging may become necessary in order to salvage the high value pines. Without this, the beetles will probably harvest these trees. With the inevitable return of dry years the writer predicts that pine beetle attacks will be devastating on such areas.

The stagnating pine reproduction can be thinned. The necessity of providing ponderosa pine with adequate growing space and with freedom from competition is receiving growing attention from research and practicing foresters. Principal attention is being devoted to thinning by mechanical methods and to brush control by chemicals. The writer believes that prescribed burning should also continue to be studied as one of the silvicultural tools that will accomplish desired thinning. It produces a spottier and rougher job, but it also costs considerably less. He does not believe that control of competing ground cover can progress very far without consideration being given to prescribed burning.

One of the greatest benefits from prescribed burning is reduction of fire hazard. As previously indicated, hazard on Tenino and Metolius Benches is very low. Prescribed burning, properly applied, should produce results somewhat comparable to results of the 1938 burn. Prescribed fire, as a silvicultural tool, can now be applied on this area under a wide range of conditions. The writer believes that protection against fire does not need to be a major problem in ponderosa pine stands similar to the stands on Tenino and Metolius Benches.

The writer believes that increasing fire hazard is one of the most dangerous developments in the Ponderosa Pine Region. The past 17 years have generally had very favorable fire seasons in the pine region of the Pacific Northwest. Critical fire seasons will inevitably return.

Summary and Conclusions

Until the present century the ponderosa pine forest of the Warm Springs Indian Reservation in Oregon was typically open and parklike, with but little debris on the forest floor and with but scattered clumps of reproduction. That surface fires burned frequently is indicated by the tree-ring and fire-scar record and by accounts of early observers.

Since the early 1900's, as a result of overgrazing and fire exclusion, there have developed exceedingly dense understory stands of reproduction of various species over the entire area. Ponderosa pine reproduction characterizes lower elevations. Most of the area, however, is monopolized by reproduction of associated species and by various shrub species. Reproduction thickets are so dense that very poor growth is occurring. Also the thickets are adversely affecting growth and vigor of the overstory trees. Pine bark beetle epidemics have caused great damage and fire hazard has increased dangerously. Correction of these adverse developments poses very grave problems in silviculture, protection, and management.

Startling contrasts to these conditions are observed on a portion of the forest swept by a hot surface fire in 1938. This fire consumed many thousands of snags and windfalls of bettle killed pines. In most of the reproduction clumps sufficient dominant trees survived to still comprise an adequately stocked stand. These trees immediately accelerated in growth and are still growing at a rapid rate. Where thinning was too severe there has developed well spaced, vigorous subsequent reproduction of ponderosa pine. Overstory trees in general are vigorous and beetle resistant. Fire hazard is very low.

These contrasting conditions, inside of and outside of the burned area, confirm that fire is a continuing factor of great ecological importance. They also indicate that fire, under proper control, can be used as a silvicultural and hazard reduction tool.

Literature Cited

1. PLUMMER, FRED G., H. D. LANGILLE, ARTHUR DODWELL, THEODORE F. RIXON and JOHN B. LEIBERG. 1903. Forest conditions in the Cascade Forest Reserve, Oregon. U. S. Geological Survey P. P. No. 9, Series H., Forestry, 6.
2. WEAVER, HAROLD. 1943. Fire as an ecological and silvicultural factor in the ponderosa pine region of the Pacific Slope. Jour. Forestry 41:7-15.
3. ————. 1947. Fire — nature's thinning agent in ponderosa pine stands. Jour. Forestry 45:437-444.
4. ————. 1955. Fire as an enemy, friend, and tool in forest management. Jour. Forestry 53:499-504.
5. ————. 1956. Wild fires threaten ponderosa pine forests. Amer. Forests 62:28-29 and 52-55.
6. ————. 1957. Effects of prescribed burning in ponderosa pine. Jour. Forestry 55:133-138.
7. ————. 1957. Effects of Prescribed burning in second growth ponderosa pine. Jour. Forestry 57:823-826.

Mouse Injury to Forest Planting in the Prairie Region of Illinois

J. J. Jokela and Ralph W. Lorenz

RODENTS are a major detriment to forest plantings in the prairie region of Illinois. Early survival and growth records for the State 4-H Memorial Camp Plantation in Piatt County and the Illini Forest Plantation in Champaign County show that rabbits and mice have been the chief factors limiting early success. Severe injury by the eastern cottontail rabbit, *Sylvilagus floridanus* (Allen), to the former plantation during its first five-year period of growth has been described[1]. Injuries of a similar nature and extent have occurred more recently in the younger Illini Forest Plantation. This report, however, describes mouse injury, principally by the prairie meadow mouse, *Microtus ochrogaster* (Wagner), to both plantations. Detailed information covering mouse injury during the successive winters of 1951-52 and 1952-53 is presented because the injuries were the most severe and extensive encountered during 20 years of forestation studies by the authors.

Description of Mouse Injury

The injuries observed were caused by mice feeding on the inner bark of the tree stems and roots. Stem injuries, somewhat more common than root injuries, were confined largely below a height of 6 inches above ground. They rarely involved the branches. Injuries characteristically consisted of the thorough removal of the bark in irregular patches. Severity of injury varied from slight exposure of the phloem or inner bark to complete girdles up to about 6 inches in width. In the 4-H Camp Plantation complete stem girdles were observed on the largest southern pine trees, with groundlike diameters of 5 inches.

Mouse injury was distinguished from rabbit injury by teethmarks and the nature and location of the injury. Rabbits frequently clip off small trees at the groundline, especially during the first few years after planting. These clipped trees often show very little evidence that rabbits fed on them.

Observation of Injury

State 4-H Memorial Camp Plantation.—The 10 coniferous- and 10 deciduous-tree plantings comprising the 36-acre State 4-H Memorial Camp Plantation at Robert Allerton Park were established in 1947 or shortly thereafter. Most plantings are totally or for the most part on Sunbury silt loam with a long history of agricultural use. The last agricultural crop grown on the area was soybeans in 1946.

Korean lespedeza sown at the time of the initial 1947 tree planting failed to suppress the rank growth of giant foxtail, ragweed, wild lettuce, velvet weed, and other weeds that typically develop on fallow land in this area. This luxuriant weed growth 4 to 8 feet in height completely dominated the planting area during the first few growing seasons following planting. Although weed growth has lessened each year, it has persisted to the present except where it has been crowded out by the fastest growing tree species.

Mouse injury is known to have occurred to most species during the first 5-year growth period and to have been particularly destructive to Osage-orange and Virginia pine during the winters of 1948-49 and 1949-50. Because these early mouse injuries were generally light and greatly over-shadowed by the then more prevalent rabbit injury, little note was taken of them.

Unusualy severe mouse injury occurred to several tree species during the winter of 1951-52 but it remained unknown until the following winter's injuries were rated in May 1953. At this time it was determined that mouse injuries incurred in the winter of 1951-52 had resulted in 2, 6, 7, and 13 percent mortality of the trees living in the fall of 1951 in the jack pine, shortleaf pine, Osage-orange, and Virginia pine plantings, respectively. Mortality to other species resulting from injuries in the same winter was considered negligible.

Mouse injuries were even more severe during the following winter. When first noted on January 5, 1953, injuries to pitch, shortleaf, and Virginia pines had already reached alarming proportions. Freshness of the injuries suggested that they were still being inflicted and that complete destruction of the southern pine plantings was imminent.

Control measures, consisting of the placement of Warfarin-cornmeal bait stations in the more severely injured plantings, were begun immediately. Mouse activity and feeding at the bait stations continued through the winter; however, no appreciable amount of injury occurred after January 5 in the baited or unbaited areas. It was suspected that the cessation of injury occurred prior to, rather than as a result of, the control measures.

Evaluations of the 1952-53 winter injuries were made in May 1953. All trees in sample rows, previously established for species adaptation studies and last measured in November 1951, were examined for mouse injury. Trees were rated according to the percent of the stem circumference injured using a scale that increased by 25 percent increments as follows:

THE AUTHORS are respectively research associate and professor, Department of Forestry, University of Illinois Agricultural Experiment Station, Urbana.

[1]Jokela, J. J., and R. W. Lorenz. Damage caused by rabbits in the State 4-H Memorial Camp Plantation. Illinois Agric. Expt. Sta. For. Note 50. August 1954.

I. No apparent injury
II. 0 to 25 percent
III. 25 to 50 percent
IV. 50 to 75 percent
V. 75 percent to complete girdle

Current injuries were distinguished from past injuries by the degree of weathering of the wound surface and the absence of callus about the current injuries.

No appreciable amount of mouse injury has occurred during subsequent winters.

Illini Forest.—The Illini Forest Plantation is located one mile south of Urbana on land retired from farm use in 1950 after a century or more of tillage. The plantation soils are classified as Sidell, Flanagan or associated silt loams, or Drummer silty clay loam. Most of the 27 species included in this report were planted in 1- or ½-acre blocks in 1951. Pine species with the exception of ponderosa pine were planted in blue-grass-timothy sod with little or no scalping. All other species were planted on plowed ground on which soybeans were grown in 1950. A dense weed cover of giant foxtail, ragweed, pigweed, velvet weed, and other weeds has developed on this plowed area each summer following planting.

The Illini Forest Plantation was severely injured by mice during the winters of 1951-52 and 1952-53. The appalling losses resulting from injuries during the former winter were not realized until the following spring and after replantings had been made in most of the initial 1951 plantings. Consequently the full extent of these losses remained unknown.

A sample of the northern catalpa planting, which had not been replanted, taken September 10, 1952, showed that mouse injury during the winter of 1951-52 had occurred on 87 percent, and had resulted in the death of 41 percent of the trees surviving through the initial 1951 growing season. Seventy percent of the living trees were of sprout origin as a result of injury. Similar observations made in the silver maple planting, which also had not been replanted, showed 62 percent injury resulting in 14 percent mortality. Twenty-two percent of the living silver maple were of sprout origin.

Only 6 species, balsam fir, ponderosa pine, red pine, American sycamore, northern white-cedar, and white spruce, of the 27 species planted in 1951 escaped severe injury during the winter of 1951-52.

Mouse injury during the following winter of 1952-53 was somewhat less severe and largely confined to tree species planted in the sodless area with a dense weed cover. Pine species planted in the sodded area, severely injured during the previous winter, escaped with only minor injuries. Heavy injuries had already been incurred prior to December 10, when the Warfarin-cornmeal bait stations were set out in the more severely injured plantings. Mouse activity and feeding at the bait stations continued through the winter months; however, no appreciable amount of injury after December 10 was observed in the baited or unbaited areas. The effectiveness of the control measures in bringing about this cessation of injury remained doubtful.

Evaluations of the winter 1952-53 mouse injuries and also of the previous winter's mouse injury to northern catalpa and silver maple were made in May 1953. Injury ratings of trees in sample rows previously established for species-adaptation studies were made similarly as at the 4-H Camp Plantation.

Mouse injury was observed only rarely in the following winters until that of 1956-57, when light injury occurred in the white ash planting.

Determination of the Effects of Injury

Survival and growth subsequent to injury were studied in three southern pine plantings at the 4-H camp and in the northern catalpa and silver maple plantings at Illini Forest. These species were chosen for this phase of the study for the following reasons: high incidence of mouse injury, reliability and ease of pairing successive measurements due to large tree size and the lack or replanting, and freedom from the complications of rabbit injury during the period of observation.

Survival and height measurements made annually during the first five-year growth period and after the tenth growing season for species-adaptation studies were utilized because the measurements were available on the trees rated for mouse injury. Supplementary measurements were obtained for southern pine after the seventh and eighth growing seasons. Height measurements in the case of hardwood sprouts were taken on the dominant sprout.

Growth, measured as the difference in total height between successive measurements, was computed on the basis of the tree surviving through the period of study. Because of the rare occurrence of mortality among uninjured trees, it was assumed that the observed mortality among the injured trees was an indirect, if not direct, result of mouse injury.

The data for southern pines were compiled by degree-of-injury classes for survival and growth computations. Since dieback of the injured stem followed by sprouting was a common response of hardwoods to injury, data for northern catalpa and silver maple were not grouped by degree-of-injury class of the parent stem, which obviously bore little if any relationship to the growth rate of the sprouts. Data for these two species were grouped by year of injury.

Results and Discussion

Susceptibility of species to injury.—The difficulty of rating tree species as to their relative susceptibilily to mouse injury is apparent in Table 1. Conifers, for example, were injured more frequently than were deciduous trees at the 4-H camp, whereas the reverse was true at Illini Forest. Sometimes a species severely injured at one location escaped with only minor injury at the other location.

White ash, cottonwood, Osage-orange, yellow-poplar, Douglas-fir, and European and Japanese larch

at Illini Forest showed high incidence and severity of injury. Southern pines with the exception of loblolly pine were injured more frequently and severely than northern pines of the same age at the 4-H camp. Jack pine planted in several rows of the pitch pine planting were injured only one-fourth as frequently and, on the average, much less severely than pitch pine in the same rows.

Loblolly pine planted adjacent to the severely injured Virginia pine escaped injury completely, although both plantings are on identical sites. The higher and more uniform initial survival of the loblolly pine planting resulting in a more complete crown enclosure and consequently greater suppression of weed growth may have contributed to this result. This view is supported by observations that injuries to pines at the 4-H camp tended to be concentrated in and about areas of poor pine survival with a dense cover of foxtail and other weeds.

Sycamore was the only deciduous species to escape with negligible amounts of injury during both winters at both locations.

Survival and growth of injured trees.—Morality in plantings of southern pine at the 4-H camp which might be ascribed to mouse injury sustained in their fifth or sixth year was almost entirely confined to trees with Class V injuries, those extending over 75 percent of the groundline circumference. Death occurred within two years after injury. Pitch pine, as shown in Table 2, exhibited an amazing ability to withstand severe injury and to maintain growth following such injury. Virginia pine showed a definite decreasing rate of growth with increasing injury. This reduction in growth was greatest during the first growing season after injury. It was no longer apparent in the third growing season after injury among trees with Class II and Class III injuries, that is trees with 50 percent or less of their groundline circumference injured. Shortleaf pine appeared to be intermediate between pitch pine and Virginia pine in its

TABLE 1.—MOUSE INJURY TO TREE SPECIES AT ILLINI FOREST AND STATE 4-H MEMORIAL CAMP PLANTATIONS DURING THE WINTER OF 1952-53

Species	Injury class[1]									
	Illini Forest					State 4-H Memorial Camp				
	I	II	III	IV	V	I	II	III	IV	V
	Percent of trees in class									
Ash, green and white	35	14	15	24	12	100	0	0	0	0
Basswood, American	91	2	6	1	0			[2]		
Catalpa, northern	78	14	6	2	0			[2]		
Cottonwood, eastern	40	7	3	6	44	94	3	3	0	0
Maple, silver	83	3	4	2	8	99	1	0	0	0
Oak, bur	84	3	3	0	10			[2]		
Oak, northern red			[2]					[2]		
Oak, white			[2]			98	2	0	0	0
Osage-orange	63	9	3	1	24	95	3	2	0	0
Sweetgum			[2]			91	0	3	0	6
Sycamore, American	96	1	3	0	0	100	0	0	0	0
Walnut, black			[2]			100	0	0	0	0
Yellow-poplar	50	5	6	4	35			[2]		
Baldcypress	85	10	2	1	2			[2]		
Cedar, northern white	95	4	1	0	0			[2]		
Douglas-fir	53	11	10	3	23			[2]		
Fir, balsam	88	7	0	0	5			[2]		
Larch, European and Japanese	57	1	4	0	38	65	9	7	4	15
Pine, eastern white	100	0	0	0	0	100	0	0	0	0
Pine, jack	97	2	0	0	1	90	6	3	1	0
Pine, loblolly	100	0	0	0	0	100	0	0	0	0
Pine, pitch	97	3	0	0	0	46	19	10	12	13
Pine, ponderosa	84	6	7	2	1			[2]		
Pine, red	100	0	0	0	0	93	7	0	0	0
Pine, Scotch	99	1	0	0	0			[2]		
Pine, shortleaf	94	3	3	0	0	52	20	12	9	7
Pine, Virginia	98	1	1	0	0	69	11	7	6	7
Spruce, white	67	17	8	5	3			[2]		

[1]Injury class represents percent of stem circumference injured at or near the ground line: I represents no injury; II, 0-25; III, 25-50; IV, 50-75; V, 75 and over.
[2]Species absent or not sampled.

TABLE 2.—SURVIVAL AND GROWTH OF SOUTHERN PINE AT STATE 4-H MEMORIAL CAMP FOLLOWING MOUSE INJURY

	Injury class									
	I	II	III	IV	V	I	II	III	IV	V
	Injured winter 1952-53									
	Pitch pine					Shortleaf pine				
Trees in sample (No.)	91	38	21	24	27	56	21	13	10	8
Trees dying during period 1952-56 (No.)	0	2	0	1	16	2	0	0	1	5
Av. total height, fall 1951 (ft.)	4.1	3.7	3.9	4.0	4.3	4.0	3.8	4.0	3.6	3.7
Av. height growth of survivors (ft.)										
1952 and 1953	2.8	2.8	3.0	2.7	3.1	3.0	2.8	3.0	2.4	1.7
1954	1.8	1.7	1.7	1.5	1.1	1.8	1.7	1.8	1.6	1.8
1955 and 1956	3.8	3.5	3.8	4.0	4.4	4.9	4.7	4.4	4.4	4.2
Total for period	8.4	8.0	8.5	8.2	8.6	9.7	9.2	9.2	8.4	7.7
Survivors with healed-over injuries, fall 1956 (%)		100	95	57	9		100	92	67	100
	Virginia pine									
	Injured winter 1951-52					Injured winter 1952-53[1]				
Trees in sample (No.)	140	21	15	5	27	96	15	10	9	10
Trees dying during period 1951-56 (No.)	0	1	0	1	27	1	1	1	2	8
Av. total height, fall 1951 (ft.)	7.6	7.2	8.1	8.1	7.2	7.9	6.9	7.5	6.7	6.2
Av. height growth of survivors (ft.)										
1952 and 1953	5.3	5.0	4.9	3.1		5.3	5.1	4.0	3.4	3.5
1954	2.2	2.0	2.1	1.4		2.2	2.1	1.7	1.4	1.2
1955 and 1956	4.7	4.4	4.6	3.0		4.7	5.4	5.2	3.9	3.2
Total for period	12.2	11.4	11.6	7.5		12.2	12.6	10.9	8.7	7.9
Survivors with healed-over injuries, fall 1956 (%)		85	40	20			71	70	43	50

[1]Includes only trees which were not injured during the previous winter.

TABLE 3.—SURVIVAL AND GROWTH OF NORTHERN CATALPA AND SILVER MAPLE AT ILLINI FOREST PLANTATION FOLLOWING MOUSE INJURY

	Uninjured	Injured		
		Winter 1951-52	Winter 1951-52 and 1952-53	Winter 1952-53
Northern catalpa (1951 planting)				
Trees in sample (No.)	17	156	14	7
Injured trees surviving without sprouting (No.)	—	4	1	7
Injured trees surviving as sprouts[1] (No.)	—	54	13	0
Trees dying during period 1952-55 (No.)	0	98	0	0
Av. total height, fall 1951 (ft.)	1.6	1.6	1.7	1.5
Av. height growth of survivors including sprouts (ft.) 1952	1.0	0.6	0.4	0.8
1953	0.8	0.8	0.8	0.9
1954	0.3	0.4	0.5	0.5
1955	1.0	1.1	1.2	1.1
Total for period	3.1	2.9	2.9	3.3
Silver maple (1951 planting)				
Trees in sample (No.)	58	78	21	2
Injured trees surviving without sprouting (No.)	—	39	1	1
Injured trees surviving as sprouts[1] (No.)	—	16	19	0
Trees dying during period 1952-55 (No.)	0	23	1	1
Av. total height, fall 1951 (ft.)	2.9	2.9	2.5	[2]
Av. height growth of survivors including sprouts (ft.) 1952	1.5	1.1	0.0[3]	[2]
1953	1.4	1.4	1.0	[2]
1954	1.3	1.3	1.0	[2]
1955	3.4	3.1	2.4	[2]
Total for period	7.6	6.9	4.4	

[1]Mainly originating during the 1952 growing season following dieback of original stem resulting from injury during winter of 1951-52.
[2]Insufficient data.
[3]Sprout growth equal to height of undamaged stem in 1951.

ability to recover from injury. In contrast to these results, injury to pine species at Illini Forest during the first winter following planting generally resulted in death.

The high morality rates among trees injured in their first winter, shown in Table 3 for northern catalpa and silver maple, also occurred among other deciduous tree species at Illini Forest. Northern catalpa and silver maple surviving injury sustained during the first winter invariably continued to survive even though injured a second time the following winter. Sixty-two percent and 87 percent, respectively, of the northern catalpa and silver maple injured in the winter of 1952-53 were sprouts originating as a consequence of injury sustained the preceding winter.

Growth reduction in hardwoods as a consequence of injury was most pronounced during the growing season following injury. The apparent lack of effect of the 1952-53 injury on the growth of catalpa may reflect the light nature of these injuries. Silver maple injured during two successive winters continued to grow at a reduced rate throughout the observation period.

Long-term effects in addition to the immediate and direct effects of mouse injury may occur. For example, it has been reported by Baxter and Grow[2] that the origin of heart rot in a 48-year-old planted stand of red oak in Michigan was traceable to mouse injuries which occurred when the trees were 5 to 10 years old.

Time of injury.—The sporadic and localized occurrence of mouse injury to forest plantations in Illinois suggests localized irregularities from the 4-year microtine cycle reported for northern United States by Hamilton[3]. Withdrawal of planting areas from cultivation are accompanied by abrupt changes in environment. The luxuriant growth of grass and weeds during the early life of a plantation on fertile soils of the prairie region, together with a lack of sufficient predators, provides an unusually favorable habitat for rapid increase of mouse populations.

Rodent population studies conducted in the grassland habitat at Trelease Woods and at Robert Allerton Park by the University of Illinois Department of Zoology indicate irregularly fluctuating rodent populations with population peaks occurring at 2- to 7-year intervals.[4] It is of interest to note that the data collected at Trelease Woods, 5 miles from the Illini Forest, and at Robert Allerton Park, one mile from the 4-H camp, indicated very low Microtus populations at these localities in the fall of 1951 and relatively high Microtus populations in the fall of 1952. Thus these data would have failed to forecast the occurrence of heavy injury to the 4-H camp and Illini Forest plantations during the winter of 1951-52. It is also of interest to note that mouse injury was more severe during the winter of 1951-52 than during the winter of 1952-53 at Illini Forest, whereas the reverse was true at the 4-H camp.

Available evidence points to the occurrence of injury during both winters at both locations during a several-week period in November and/or December that coincided with the approach of winter when below-freezing temperatures occurred almost daily. The previously mentioned Warfarin control measures, which were initiated after mid-December, were applied too late to be effective in preventing mouse injury.

Clean cultivation would be helpful in reducing mouse injury. In the case of the 4-H camp plantings,

[2]Baxter, D. V., and Tom Grow. Unusual decay in young oak plantations following early rodent injury. Michigan Forestry Note 12. 1955.

[3]Hamilton, W. J., Jr. The biology of Microtine Cycles. Jour. Agric. Research, Vol. 54, pp. 779-790. 1936.

[4]Personal communication with professors S. C. Kendeigh and D. F. Hoffmeister.

cultivation would have been necessary through the fifth growing season to have been effective in preventing the severe injury which occurred to these plantings in their fourth and fifth winters. The irregular spacing of machine-planted trees makes cross cultivation impossible. Clean cultivation attempted in the Illini Forest plantings in their first summer proved to be costly and impractical.

Summary

Rabbits and mice have been the chief factors limiting early success of the State 4-H Memorial Camp and the Illini Forest Plantations in central Illinois. Ten years of observations of mouse injury, principally by the prairie meadow mouse, are reported. Data relating to the incidence and effects of severe mouse injuries during the winters of 1951-52 and 1952-53 are presented.

Ash, cottonwood, Douglas-fir, larch, Osage-orange, yellow-poplar, and southern pines, with the exception of loblolly pine, were severely injured at one or both locations. Rating of species according to their relative susceptibility to mouse injury, however, would be difficult because of the variable nature of injury with location and time.

Injury to pine or hardwoods during the first winter following planting generally resulted in death. Mortality among pine trees injured at older ages was confined to trees having had more than 75 percent of their stems girdled at the groundline and generally occurred within a year after injury. Dieback of established hardwoods from mouse injury usually was followed by sprouting, frequently resulting in multiple stems. Growth reduction varied with the degree of injury. This reduction was most pronounced in the first growing season following injury, after which it diminished rapidly.

Clean cultivation does lessen mouse injury, but it is costly and impractical in many forest plantations. Poisoning, to be effective, should be applied prior to the advent of cold weather.

How Many More New Schools?

Henry Clepper

DURING 1958 three institutions announced that they were starting four-year professional programs in forestry: Arizona State College at Flagstaff, University of Illinois at Urbana, and Southern Illinois University at Carbondale.

These are in addition to two new four-year curriculums announced in 1957 at Clemson Agricultural College, Clemson, South Carolina, and at Humboldt State College, Arcata, California.

Whether this continuing proliferation of forestry schools is economically sound in a nation where the costs of education are constantly mounting we may leave for the legislators in those states having state-supported institutions to decide. I point out without comment that California now has two state-supported programs of forestry education, Illinois has two, Louisiana has three, Michigan has three, and Washington has two.

As of this writing, there are in the United States 43 colleges and universities offering programs in forestry leading to the bachelor or master degree. Of these 43, 27 are accredited by the Council of the Society of American Foresters. Of the remaining 16, 5 are attempting to strengthen their programs hoping to merit eventual accreditation. At least 10 of these institutions will be unable for various reasons to attain accredited status during the foreseeable future, if ever.

In passing, I know of at least one additional state—there may be others—where it is seriously being proposed that a new four-year program be started. Incidentally, this state already has an institution with a four-year forestry curriculum that is not accredited.

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Salaries Are Involved

Although not an educator, I have been involved in professional education and accrediting for two decades. As executive secretary of the Society of American Foresters, I have had an opportunity to observe the fluctuating conditions in forestry employment and in salary scales. Employment and salaries are directly related to educational output and it is in part from this viewpoint that the following considered remarks arise.

It has long been recognized that foresters' salaries, except in a relatively few specialized positions, are lower than workers in numerous other professional and technical fields. In general, the following workers all enjoy higher income than foresters: professional accountants (CPA's), professional architects (licensed), professional engineers (aeronautical, architectural, chemical, civil and sanitary, electrical, mechanical, metallurgical, mining, naval architecture, petroleum, and others), lawyers, physicians, optometrists, osteopathists, and veterinary surgeons.

One might argue that training for careers in these fields is longer, more expensive, and more difficult than in forestry, and that consequently these professional workers are entitled to higher compensation. All that may be true, but the

fact remains that it is harder to get an education in these callings, that educational standards are high and getting higher, and that even after graduation state licenses may rule out the less qualified.

Now contrast this with our conditions in forestry. There are institutions purporting to offer a four-year curriculum in forestry with a faculty of two or three professional foresters, none of whom is higher in rank than associate professor, who together attempt to teach all the courses involved in the five professional areas of the standard curriculum: silviculture, forest management, forest economics, forest protection, and forest utilization.

Can it be done? The Council of the Society, on the recommendation of the Committee for the Advancement of Forestry Education, has approved the bases for accrediting which require a forestry faculty of not less than six as the absolute minimum. Many educators believe these criteria to be too liberal.

What of the Weak School?

At the end of four years, the graduate from this two- or three-man faculty has a bachelor of science degree with a major in forestry. If his education terminates at this point, and for most students it does, he may find that job opportunities are largely restricted to employers who do not know the significance between accredited and nonaccredited professional education, or who know about it but do not care. In any event, he is often willing, even anxious, to work for a smaller salary than would the graduate of an accredited school. In short, he meets competition by accepting less.

Twenty years of experience in dealing with employers seeking foresters, and foresters seeking employment, have revealed some startling conditions. There are employers—a few foresters among them—who prefer to hire the graduate of the nonaccredited school because he may work for less salary, and once on the job may be less inclined to develop ambitions for rapid promotion and higher pay.

It has been asserted that, because of America's possible increasing demand for forest products, we need all the foresters than can be produced. To say more foresters should be at work is one thing. But to graduate more foresters than the conditions of employment can absorb is wasteful of professional talent and unfair to the young forester.

Forestry employment has been steadily rising and promises to continue to rise. But our professional responsibility to the public interest requires that the quality of practitioner produced by our schools should steadily rise also. To attempt to provide full training in a four-year curriculum with a faculty of two or three forester-instructors covering the whole body of professional courses has been done and is being done ,but it is doubtful if it is done well.

Should our Society continue to recognize such a program as being education of professional quality? In doing so, does not the Society give gratuitous and unmerited professional acknowledgment to something that forestry educators know is academically substandard?

Unused Plant Capacity

An argument frequently used to justify the addition of new schools of forestry is that with America's rapidly rising population more educational facilities will be required to provide for students seeking professional training, including forestry. Let us examine this contention.

The largest all-time number of graduates from our schools of forestry occurred in 1950 when 2,321 undergrduate degrees and 275 master's degrees were granted. In 1950 the total number of schools was 36 (22 accredited; 12 nonaccredited).

In contrast, the number of degrees granted by our schools in 1957 (the latest year for which exact figures are available) was 1,174 undergraduates and 223 graduates.

In short, the 36 schools in existence in 1950 were capable of training nearly twice as many students as were turned out in 1957. Put another way, we might say that only half the capacity of the schools existing in 1950 was being utilized in 1957. The question then follows: if there was up to fifty percent unused capacity in the schools in 1957, where is the justification, considering the profession broadly and nationally, for increasing the number of plants?

What Colleges Should Know

One reason for the present proliferation of forestry schools is the lack of appreciation by college administrators of forestry as a profession and of the scope of educational preparation necessary for it. The Society of American Foresters cannot be blamed for this condition.

As early as 1932 Graves and Guise in their book *Forest Education* stated unequivocally that there were too many schools of forestry. (The total was then 26.) "Better average result from the standpoint of the profession could doubtless be obtained," they wrote, "if there were a small number of schools, each well supported financially and on a thoroughly stable basis, in contrast to the present system which includes a considerable proportion of weakly financed and inadequately equipped institutions."

Although written a quarter-century ago, the following statement from their book is as apt now as it was then: "The reason why there are so many forest schools today is that many of them are conducted on a basis of very small appropriations, wholly inadequate to build up a first class preparation in forestry of professional grade."

In several recent instances college executives who must have known in advance that in starting new forestry curriculums they would be unable to develop schools strong enough to merit accreditation, went ahead regardless. That is, regardless of the need for the curriculum and regardless of inadequacy of their facilities.

In three instances certain institutions advanced their quite adequate

preforestry programs to the status of four-year curriculums for no other reason than that rival institutions in the same state threatened to start them.

It is not a sad commentary on education and educators that educational systems in the professions may be, and often are, developed, not on the basis of broad considerations of professional needs, but on the basis of local institutional rivalries?

In an attempt to provide professional guidance for college executives considering the establishment of schools or forestry, the Council of the Society in 1947 adopted a policy on new schools. This policy has been examined and reaffirmed periodically, and with minor changes has continued in force. As approved in June 1957 it is as follows:

> Because of the tendency of certain universities and colleges to offer instruction in forestry on the professional level without being fully qualified for the purpose; and because the 37 existing schools offering professional forestry, including the 27 which are currently accredited by the Society of American Foresters, are deemed sufficient to train the foresters needed in the foreseeable future, the Council authorizes the following statement on proposed new schools of forestry.
>
> In view of the capacity of existing schools of foserty in the United States to supply the demand for profesional foresters, the Council of the Society of American Foresters recommends against the establishment of new schools or departments for professional training in forestry, unless there is a need not adequately met by the existing schools and unless such new schools or departments are effectively staffed, properly financed, and possessed of adequate facilities for professional education.
>
> The Society welcomes the introduction of nonprofessional courses in forestry in colleges and universities as a matter of general education.
>
> Forestry graduates of institutions which do not meet the standards of professional training set by the Society of American Foresters are not accepted by the profession as members of the Society on the same basis as are the graduates of approved schools, and accordingly may be handicapped in securing professional recognition.

Despite this policy, which originally was adopted only after careful consideration, there have been nine new schools established during the 11 years since its adoption. Although it was made available to college executives contemplating new schools, it apparently had little, if any, effect on their decisions. In one case, it possibly deterred a teachers' college from starting a degree program in forestry, but what business a teachers' college would have in beginning a program in any recognized profession is beyond comprehension anyway.

However, the mind of the academic executive is often inexplicable, as witness the case of the president of a small New England college with a total student body of 350 and a faculty of 20 who actually proposed starting a degre program in forestry without a single professional forester on the faculty. This, mind you, was in a state with a state university fully accredited for forestry instruction, a fact which he had not bothered to find out.

As an alternative, the college started a two-year course in forestry and conservation without either a staff forester or even a conservationist who could be recognized as such. Yet the stated reason for this program is that it was "felt to be needed for the future interests of our national well-being," which dignifies with a spurious and preposterous form of public interest something that is inherently illogical.

Additional examples of haphazard organization of forestry courses by college executives could be cited from the files of the Society. No good purpose would be served thereby except to prove that which is already self-evident: forestry education suffers from a group of weak school institutions whose executives are either unwilling to recognize their weaknesses, or, who when weakness is pointed out, are unable to do anything about it.

Possible Remedies

What might be the remedies for this unhealthy condition, assuming that there may be remedies and that they could be applied?

The first remedy, one that is unlikely to be applied voluntarily by any institution, but one that could be applied by a legislature withholding financial support, is for some schools to withdraw from the professional type of instruction and instead concentrate on preforestry or subprofessional or specialized training.

Graves and Guise saw the problem and the remedy as follows:

> "The forest schools which are underfinanced face a problem of peculiar complexity. At the present time they are undertaking more than they can accomplish in justice to themselves and their students. The simplest solution, if feasible in practice, will be to increase the annual budget by progressive steps according to a well-formulated plan, until the real needs are supplied. If it is out of the question to secure additional funds, we suggest that the scope of the work undertaken be circumscribed to what can be accomplished on a high level of educational efficiency. *If the funds available do not permit a given school to cover the whole groundwork of professional training, it would be a wise course to restrict its offerings to the foundational work and elementary aspects of forestry. Circumscribed work of excellence would gain for a school greater recognition than an effort to cover a larger field with such financial handicaps as are certain to impair the thoroughness and effectiveness of the instruction in forestry.*"

It is one of the unhappier aspects of forestry education that college executives have been willing on occasion to sacrifice quality for bigness. As was mentioned previously, three institutions advanced their quite adequate preforestry programs to four-year curriculums that now are not adequate enough to meet accrediting standards.

Perhaps it would be too much to expect a college president to reverse the setting up of a four-year curriculum in favor of a preforestry or a nonprofessional curricu-

lum. There is precedent for such action, however.

Among the institutions that formerly offered professional programs in forestry but that do so no longer are Colorado College at Colorado Springs, Cornell University, University of Nebraska, and the Pennsylvania State Forest School at Mont Alto. Colorado's and Nebraska's curriculums were discontinued entirely. Cornell's New York State College of Forestry was moved and centered in the State University of New York at Syracuse. The Pennsylvania State Forest School was merged with the Pennsylvania State College (now University).

There are at least a half-dozen institutions that could, with benefit to the profession of forestry as well as to themselves, adopt the suggestion of Graves and Guise quoted in italics above.

A second remedy which might be applied by the Society itself would be to withhold membership from graduates of weak schools. As proposed by a forestry educator, this action would simply involve amending Bylaw 5, which could be done by vote of the Council.

This bylaw provides that graduates of nonaccredited schools which offer the five professional courses (silviculture, forest management, forest protection, forest economics, and forest utilization) shall be eligible for Affiliate Membership immediately upon graduation. (After two years of forestry experience, they may advance to Junior Membership.)

Bylaw 5 could be amended by vote of the Council to limit admission to Affiliate Membership to graduates of institutions with no less than five forester-teachers on the faculty.

The effect of this change in the bylaw would be to withdraw recognition from institutions purporting to teach the complete body of courses that make up the standard forestry curriculum with a faculty of two or three professional foresters. It would serve notice on those institutions and on the students that the training offered is not considered to be adequate, without supplementary graduate training in an accredited school, for entering the profession.

Admittedly, the Council might be reluctant to take such action, although it was done before when the Council decided that the graduates of certain forestry schools would be eligible for Junior Membership and others would not. In fact, in 1935 the Council began the rating of schools of forestry, resulting in the first application of accrediting to professional forestry education, for membership purposes.

Forestry education has reached the stage where the profession should take a forthright stand, in the interest of future students and in the profession's own self-interest. As spokesman for the organized members of the profession, the Society has a responsibility for leadership in supporting a continuing higher level of schooling.

Mississippi Forest Survey Completed

Mississippi forests are growing more pine but less hardwood than is beirg cut, according to a new survey of the state's forest resources. Because of understocked stands, growth is only about half the potential yield.

A report of the survey was released by State Forester Clifton B. Marlin and Philip A. Briegleb, director of the Southern Forest Experiment Station, U. S. Forest Service. The survey is an activity of the Experiment Station, whose headquarters are at New Orleans, La.

In announcing the results of the survey, Briegleb pointed out that "completion of the huge timber inventory was advanced many months through generous cooperation from numerous private organizations and individuals and from the Mississippi Forestry Commission." Liaison between cooperators and the Forest Service was provided by the Mississippi Forest Survey Committee, of which James W. Craig, president of Forestry Suppliers, Inc., is general chairman and Joseph E. Weatherly, deputy state forester, is secretary-treasurer.

Mississippi's forests are growing 1.3 billion board feet of softwood sawtimber annually and 0.8 billion of hardwood. Softwoods include the southern yellow pines as well as cypress and redcedar. In 1956, when the latest cutting statistics were compiled, logging removed 0.7 billion board feet of softwood and 1.0 billion of hardwood.

Forests cover 17 million acres of the state's total land area of 30 million acres, the survey found. This is 4 percent more forest land than there was in 1948, when the previous survey was completed. The increase is largely due to reversion of farmlands to forest.

Mississippi's timber supply in sound, well-formed trees at least 5 inches in diameter amounts to 7.6 billion cubic feet. Softwood volume has increased 8 percent. Hardwood has declined 21 percent.

The volume in sawtimber is 25.5 billion board feet. In these sizes, softwood volume has increased 9 percent while hardwood has dropped 29 percent.

The increase in softwood appears to be attributable mainly to stepped-up management programs on the lands held by forest industries and on the public forests. Land clearing, excessive cutting, and heavy drought-induced mortality contributed to the decline of hardwoods in bottomland areas such as the Delta region. In the uplands, timber stand improvements operations helped reduce hardwood volume on areas better suited to growing pine.

All together, Mississippi's extensive forest resource supports about 1,000 sawmills, 6 pulp mills, and some 100 miscellaneous wood-using plants.

A full report of the survey may be secured from the State Forester's office at Jackson, Miss., or from the Southern Forest Experiment Station, 2026 St. Charles Avenue, New Orleans 13, La.

Forestry Education in Thailand, The Modern Siam

Ray A. Yoder

THE PROGRAM OF AID to other countries through the International Cooperation Administration has many facets. Important to the long-range success of the program is assistance to the universities of the countries cooperating in the program, including those which have schools of forestry.

The College of Forestry at Kasetsart University, Bangkok, Thailand, provides an example of a school which is receiving such aid. The assistance arrangement is similar to that used in like situations elsewhere — Kasetsart University has a contract with Oregon State College which provides that the latter institution maintain a staff of six visiting professors on the Kasetsart campus, each for a period of two years. Money is provided through ICA and the Thai Government, respectively. The project is an integral part of the program of the U.S. Operations Mission to Thailand, with which organization the work of the contract team is closely coordinated.

The writer was assigned to the task of advising the College of Forestry in September 1956. It is hoped that this record of experience will contribute to a better understanding of the subject of foreign aid of this kind, and that it may help some of the forestry schools in the United States in the problems they encounter in training the increasing number of students which come to them from tropical countries each year.

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The Place of Forestry in Thailand

A brief resume of the forestry situation in Thailand should lead to a better understanding of the program in forestry education. The forests cover 63 percent of the land area. All forest lands are state owned, and all are administered by the Royal Thai Forest Department. The present trend is toward nationalization of forest industries, mostly through the Forest Industries Organization, an agency of the Forest Department. The formerly great teak resources are waning away rapidly; the major concessionaires have drastically reduced the scope of their operations, and several have closed down. On the other hand, a few small forest products industries have been established recently with private capital, especially for the production of particle board and similar products. Except for a very few wood technologists who join such firms as these, graduate foresters find employment with the Forest Department or with other branches of government.

An abundance of virgin timber and the lack of markets for many of the numerous species found in the forests of the country have been important in shaping departmental forestry programs. Until recent years the department was able to meet its personnel needs by recruiting mostly graduates trained at the ranger school level. Wherever need of special skills was evident, selected men were sent abroad to receive training.

In recent years it became evident that education at the university level was necessary if the forestry profession was to be able to meet the increased responsibilities of an expanded program. The department has been active in sending its personnel abroad for advanced training. At the same time, the College of Forestry has sent three of its faculty to the United States to secure the master's degree in forestry, and two men have received bachelor's degrees from the University of the Philippines; all this training was in anticipation of extending the program of the college to include degree work, which began in the academic year 1956-1957.

The program of training in the College of Forestry reflects the above general situation, especially in matters of curriculum, the number of students trained, and the educational preparation of the faculty. The college is now in a very critical transition period, during which it is making every effort to

FIG. 1.—Class in forest engineering setting boundary post. The log cribbing prevents disturbance by wild elephants.

develop an adequate professional school, at the same time meeting its responsibilities for training men at a somewhat sub-professional level.

In the Beginning

The College of Forestry, which was founded by the Forest Department in 1936, antedates the university of which it is a part. Its first location was at Phrae, in northern Thailand, where it became a part of and was operated as a branch of Kasetsart University upon the founding of Kasetsart in 1943. When first seen by the writer, the college had just finished its first year on the Kasetsart campus in Bangkok. The move from Phrae resulted in new buildings for the college, including housing for the faculty, but it left behind the forest lands which had been used for field laboratory purposes. There are no forests on the flat coastal plain around Bangkok. Equipment and library were both inadequate for the existing program and the one being initiated. Only four of the staff of 16 held degrees in forestry. The remainder had completed three years of work for a certificate.

The working relationship was established soon after the writer's arrival. It was perhaps natural to assume that the title of "visiting professor" implied instructional duties only. The contract, however, specified that the post was primarily advisory. This provision reflected a belief that the visiting staff could make the most enduring contribution by doing a limited amount of teaching, but concentrating the main effort upon needs in other areas.

The university provided a counterpart, Dean Therd Suprichakorn, with whom the above and most other problems were worked out. It was mutually decided that the new staff member would begin by teaching the laboratory portions of two courses in which were enrolled those faculty members who were working upon completion of their bachelor degrees. In the meantime other needs of the college were explored. The courses taught were aerial photogrammetry and the mathematics of finance, in neither of which was the language barrier too formidable. A teaching counterpart was provided for each course. It was hoped that the presence of the staff members would make it possible to introduce some innovations on teaching principles, methods, and materials, by example. Too, the faculty members in these classes hoped to go abroad under scholarships, and they would thus gain additional proficiency in English, their second language. On the whole, this worked out quite well. The teaching counterpart in each course cooperated in the preparation of the course outlines, lists of reading references, examinations, and other materials. He also came to the rescue whenever language difficulties arose.

Administrative and policy matters of mutual concern were handled by consultation with the officially appointed counterpart, Dean Therd Suprichakorn, and in some cases, the Honorary Dean, Prince Snebsukswasti Sukswasti, a former Director-General of the Royal Thai Forest Department, and currently advisor to the Forest Industries Organization.

Students

There are 166 students currently registered in the College. Though they come from all parts of Thailand, practically all of them spent the last two years or so of their pre-university preparation in Bangkok, preparing to pass the University entrance examinations. These examinations are highly competitive: there were 500 applicants for admission to the freshman year in forestry at the beginning of the academic year 1957-58. Only 50 could be accepted, because of lack of space.

The faculty has succeeded in raising student standards of academic performance, professional ethics, and esprit de corps with the shift in emphasis from vocational to professional training. More emphasis is being placed upon work outside of the classroom, and upon better performance in coursework and examinations. Raising the standards of student performance has had a salutary effect upon both the students and staff. The students have organized a very active Forestry Club, and have athletic teams in several sports.

Like all Thai, the students are unfailingly courteous. The student body of Kasetsart University annually holds a ceremony for the purpose of paying respect to the faculty, as part of a nationwide program in recognition of teachers.

Curriculum

The curriculum, as it does in other countries, reflects the general forestry situation within Thailand, and the employment responsibilities which the men will face after graduation. All receive a certificate after three years of training. This permits certificate-holders to enter the civil service. A limited number of the better students may be allowed to continue for the additional two years required for the bachelor degree. The certificate program considerably complicates the matter of curriculum, since specialization by the degree candidate does not begin until the fourth year. Too, there is a tendency, perhaps natural under the circumstances, to give the maximum amount of forestry training in the first three years. The administration of the college is attempting to remedy the situation by planning shifts in curriculum which will allow specialization to begin in the third year, and is considering the eventual termination of the certificate program. For the time being, however, the program is directed toward two objectives. The first three years are for the training of lower-echelon personnel; those who complete the full five years of work will be qualified for entering the profession at a higher rank and working toward the top technical and administrative posts.

Two fields of specialization, forest management and wood technology, are open to the students who complete the full five years of

study. Some consideration is being given to the possibility of offering a major in forest engineering as a field of specialization, but no definite plans have been formulated.

The list of forestry courses offered differs little from the lists of courses in the United States. The contents do not differ radically, except that some of the courses, especially those in the first three years, have less depth of coverage than would be true in the better American schools.

The lack of supporting courses of a service nature is outstanding, particularly in mathematics, physics, and surveying. The void in these areas is striking, since other schools on the campus also have need of these fundamental courses. The need is partially filled by means of part-time instructors.

The liberalizing courses which thicken the catalogues of most American colleges and universities are not found at all. This situation reflects the local philosophy of education; liberal arts courses should be restricted to the liberal arts student, and scientific education should be confined to science.

Improvement of Teaching Staff

The problems of up-grading the instructional staff are numerous and varied. All are employees of the Ministry of Agriculture, of which Kasetsart University is a department, and all hold civil service status. As is true in other countries, men of their calibre can obtain greater financial rewards by working elsewhere. Nevertheless the bulk of the staff is made up of devoted, self-sacrificing men who are dedicated to the teaching profession. Without exception, they are doing all that they reasonably can to improve themselves, within the limitations imposed by their circumstances. All are spending from a meager income to improve their English, and all are hopeful that they will have an opportunity to complete their studies abroad. Every member of the teaching staff will possess a bachelor degree by April 1958.

The contract between Kasetsart University and Oregon State College provides for sending abroad for advanced study (in this case for the master's degree) of several of the staff each year. This was not found to be possible for the academic year 1957-1958, because of certain administrative difficulties. However, three of the staff are tentatively scheduled to go for the academic year 1958-1959. Two men are now studying abroad under auspices other than ICA.

For those who remain, the program of staff improvement consists of a series of staff seminars designed to improve teaching methods, curriculum, etc., and of individual work with the visiting professor.

College Forests

Lack of forest lands upon which to conduct the field work necessary to a well-rounded program of instruction has been felt by the faculty since the move from Phrae. A makeshift arrangement of field trips during the time between semesters has helped, but it is by no means satisfactory, since it lacks continuity. Too, the logistics of this procedure create much loss of time, heavy expense, and unforeseen difficulties.

To meet the need for forest lands, approval in principle was secured from the Royal Thai Forest Department for the setting aside of a suitable area of forest lands from those administered by the department. A great deal of time was spent in a search of the country for the most appropriate forest for the purpose. The Royal Thai Forest Department has officially granted the college the use of a tract of about 45,000 acres within five hours travel time by highway from Bangkok for its purposes. The college expects to gain full ownership within the next several years. Plans have been completed for construction of a permanent camp, a forest nursery, and related facilities. The program includes plans for setting aside natural and other areas of ecological significance. Provision will be made for managing the tract so as to develop it into a fully managed forest for research and demonstration purposes. The research program is still in the formative stages.

Library

Lack of sufficient modern textbooks, reference works and technical publications has seriously handicapped the development of the college. The unavailability of these items has created a pattern of relying too heavily upon the lecture method of instruction in situations to which it is not adapted, and has fostered student habits of not reading assignments from the few textbooks which are available. Only a few professional journals are on hand. However, subscriptions have been placed for the most important technical journals, which are currently being received.

The Rockefeller Foundation has contributed a substantial sum for the purchase of books. Since the students are mostly financially unable to buy textbooks, an adequate supply was ordered. The remainder of the fund was used for the purpose of buying what were considered to be the most outstanding reference works in the field of forestry. This nucleus should serve as the beginning of a working library. Generous contributions have also come in from such sources as individual members of the Society of American Foresters, and from Oregon State College. Practically all of the literature is in English.

A complete rearrangement of the physical facilities was provided, and a manual prepared to serve as a guide to procedures in making better and more complete use of the library. Several instructors are providing students with lists of references, basing examination questions upon them, and requiring the preparation of a number of abstracts.

Equipment

Expansion into the professional-level program naturally found the college short of needed equipment, except in the department of wood technology. The writer began the teaching of a laboratory in aerial photogrammetry with 24 sample

photographs and 4 pocket stereoscopes. However, the cooperation of several agencies, both Thai and American, resulted in obtaining the loan of enough equipment and supplies to do the job very adequately.

Both American dollars and Thai currency are coming to the rescue —sufficient equipment has been purchased to enable every student to gain a complete acquaintance with the items which he will normally use in his profession. In addition, visual aids of several kinds are on order. All of these items will be received in time to give instruction in their use before the departure of the visiting professor. The total cost is a surprisingly low figure.

One large lecture room is being subdivided into rooms for equipment storage and issuance, and a complete laboratory for aerial photogrammetry. A manual has been prepared to serve as a guide to proper use and care of equipment and facilities.

The Future

The Thai language is closely related to the dialects of the neighboring countries of Cambodia, Vietnam, Laos, and the Shan States of Burma. None of these have institutions of higher education in the fields of agriculture and forestry, such as exist at Kasetsart. All of them send an increasing number of students abroad each year for study in these fields. To qualify for such study, the students must first learn a foreign language, which is usually English. Kasetsart University and the College of Forestry might well consider the numerous advantages to be gained by planning their mutual growth so that a position of leadership can be assumed through making their facilities available to students from these neighboring areas, with their common bond of language and community of interests.

The growth of Kasetsart University and its College of Forestry has been phenomenal, especially with regard to the physical plant. It is doubtful that many of the older institutions of higher education in the United States have achieved as much during the first fourteen years of their existence. It is hoped that the future growth of Kasetsart and the college will find both foremost in their fields in Southeast Asia.

Conclusion

A few suggestions in closing are probably in order, for the possible benefit of those institutions and individuals who plan to engage in similar work. The writer's experience strongly confirms the wisdom of the policy expressed in the contract between Kasetsart University and Oregon State College, which specifies that the visiting professor's task is primarily to provide help and advice in strengthening the College or Department to which he is assigned. It is not that direct teaching is unimportant, for instruction can serve as a very useful vehicle in the improvement program. It is rather in recognition of the fact that the needs and ambitions of an institution usually extend into areas other than merely teaching, and that help given in such areas normally has a useful life much longer than the duration of the visiting professor's tour of duty.

The writer has been outstandingly fortunate in being assigned counterparts, both administrative and teaching, who are sincere and hard-working in their efforts to advance the college. He hereby extends a sincere vote of thanks to Dean Therd Suprichakorn and the faculty and students of the College of Forestry, for the numerous courtesies extended in guiding him while he was attempting to assist the college.

"Is this a good use of the American taxpayer's money?" This question is asked very often, usually in tones which imply that it is not. Recognizing the dangers of reasoning from the specific to the general, the writer nevertheless must answer in terms of his own experience. The College of Forestry has made genuine and lasting progress in several important areas, for the basic reason that it wanted very much to do so, but needed help. To achieve the ends desired, the faculty and administration have made a vigorous effort in the total program of cooperation. For at least this one drop in the Foreign Aid bucket, the answer is an unqualified "yes."

Influence of Topography on the Future Composition of Lower Piedmont Forests

E. V. Brender
and Lawrence S. Davis

INVASION OF PINE stands by hardwoods presents a serious forest management problem in the lower Piedmont region of South Carolina, Georgia, and Alabama. Much of the land, originally covered by oak-hickory forests, seeded in to pure pine after being cleared for cultivation and then abandoned. On many sites hardwoods seed in again soon after the pine stands reach sapling size, but on other sites hardwoods are slow to encroach.

Observations made on the Hitchiti Experimental Forest near Macon, Georgia show that the rate of hardwood invasion is strongly influenced by aspect, degree of slope, and position on the slope. These factors outweigh and obscure any effect of soil type. A dense pine overstory retards the growth of a hardwood understory, but has little effect on the occurrence of hardwoods. These observations were substantiated by a detailed examination of understory types on 280 acres of 40- to 100-year-old stands of loblolly pine sawtimber on the Experimental Forest. The understory was mapped as:

1. Pine: Over 60 percent stocked with pine seedlings and practically no competition from understory hardwoods.

2. Pine-hardwoods: Thirty to 60 percent stocked with pine seedlings and less than half of the pine free of competition from understory hardwoods.

3. Hardwoods: Less than 30 percent stocked with pine seedlings and only a few of them free of competition from the dense hardwoods understory.

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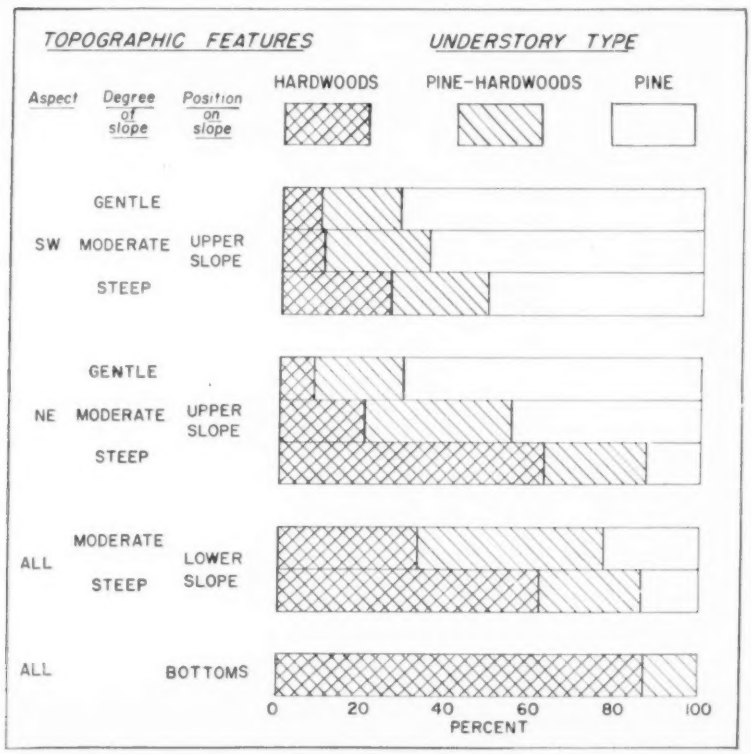

FIG. 1.—Distribution of loblolly pine understory types in relation to aspect, degree of slope, and position on slope at the Hitchiti Experimental Forest in Georgia.

The understory cover maps were matched with soil maps showing aspect, degree of slope, and position on the slope. The topographic classifications recognized were:

1. Aspect: NE slopes—included N, NE, and E aspects; SW slopes—included S, SW, W, NW, and SE aspects.

2. Degree of slope: Gentle—0 to 7 percent slope; Moderate—7 to 14 percent slope; Steep—14 percent slope.

3. Position on slope: Upper slope—upper two thirds of the range of elevation; intermittent stream and gully slopes usually fall entirely within this class; Lower slope—lower one-third of the range of elevation adjacent to permanent streams; Bottoms—creek bottoms and deep coves.

Aspect.—Aspect, of course, does not apply to the bottoms, and on the lower slopes all aspects favor early hardwood invasion, but on the upper slopes the influence of aspect on hardwood invasion is important. The hardwoods are most numerous on the northeast aspects (Table 1).

Degree of slope.—While the effect of steepness of slope is modified by both aspect and position on the slope, there is a definite increase in the amount of hardwood understory as the degree of slope increases (Table 2).

Supplemental measures to control hardwoods and insure pine regeneration will be needed on about one-fourth of the gentle slopes, one-half on the moderate slopes, and on nearly three-fourths of the steep slopes.

Position on the slope.—Hardwoods invade rapidly in bottoms

Left

FIG. 2.—A 40-year-old loblolly pine stand on a gentle upper slope supporting understory pines; no hardwood control measures are needed here.

Above

FIG. 3.—A 50-year-old loblolly pine stand on a lower slope; as the slope gets steeper the hardwoods become more numerous.

and coves, more slowly on lower slopes, and more slowly still on the upper slopes (Table 3).

On the upper slopes, limited hardwood control measures need to be applied to one-fourth of the area, and drastic measures to one-fifth of the area if the pine component is to be increased. Pure pine becomes re-established on the remainder of the area without any control measures.

Only about one-fifth of the lower slopes will permit the re-establishment of pine without hardwood control measures. Pine may be perpetuated on one-third of the area if control measures are applied, but on the remainder of the lower slopes, as well as in all bottoms and coves, management should be aimed toward the growth of hardwoods rather than pine.

Combined effect of aspect, degree of slope, and position on the slope.—While each of the three topographic classifications has an effect on the species understory composition of loblolly pine stands, it is their combined effect that shows the clearest pattern (Fig. 1). On the southwestern upper slopes hardwood invasion is serious on only one-tenth of the gentle to moderate slopes, and on one-fourth of the steep slopes (Fig. 2). On the cooler and more moist upper slopes, hardwood invasion increases rapidly as the steepness of the slope increases, two-thirds of the steeper slopes being covered by dense hardwood understories. Aspect has little effect on the lower slopes; the lower slopes of all aspects are comparable to northeastern upper slopes in that hardwoods become more numerous as the slope gets steeper (Fig. 3). Bottoms present the most serious problem for pine management because nine-tenths of the area is covered with dense hardwoods and the remaining portion supports mixed pine-hardwoods.

TABLE 1.—DISTRIBUTION OF UNDERSTORY TYPES ON UPPER SLOPES BY ASPECT

Understory	SW aspect	NE aspect
	Percent	
Pine	62	36
Pine-hardwoods	23	29
Hardwoods	15	35
	100	100

TABLE 2.—DISTRIBUTION OF UNDERSTORY TYPES BY DEGREE OF SLOPE

Understory	Gentle slopes	Moderate slopes	Steep slopes
		Percent	
Pine	72	51	30
Pine-hardwoods	19	32	24
Hardwoods	9	17	46
	100	100	100

TABLE 3.—DISTRIBUTION OF UNDERSTORY TYPES BY POSITION ON SLOPE

Understory	Upper slope	Lower slope	Bottoms and coves
		Percent	
Pine	53	18	0
Pine-hardwoods	25	32	13
Hardwoods	22	50	87
	100	100	100

Three general conclusions can be drawn from these correlations of the influence of topography on the rate at which hardwood invades loblolly pine stands in the lower Piedmont.

1. Loblolly pine can usually be perpetuated without hardwood control on all gentle upper slopes and on moderate upper slopes with a southwestern exposure.

2. Loblolly pine can be perpetuated if hardwood control meaures are practiced on steep upper slopes with a southwestern exposure, moderate upper slopes with a northeastern exposure, and on all moderate lower slopes.

3. Loblolly pine will be difficult, and perhaps unprofitable to perpetuate because of hardwood competition on steep upper slopes with a northeastern exposure, on all steep lower slopes, and in bottoms.

The Austin Cary Memorial — 20 Years

P. Warner Frazer

On January 14, 1939, the Austin Cary Memorial was dedicated under the sponsorship of the Society of American Foresters as a tribute to the life and work of one of America's first foresters. Twenty years seems a relatively short period of time, yet the questions may very well be asked: Who was Austin Cary? What were his achievements? Why a memorial to him? In case the answers to these questions seem obvious to some foresters, it should be pointed out that membership of the Society has grown from 2,500 at the time of Cary's death to 12,000 at the present time. In addition, a recent survey shows that 53 percent of SAF members are 40 years of age or less, evidence that there are many within the Society who may have only a sketchy idea of the life and work of Austin Cary (*3*).

In April 1936, at the age of 71 Austin Cary succumbed to a heart attack on the campus of the University of Florida (*2*). Dr. Cary's death came approximately eight months after his retirement from the U. S. Forest Service, the employer for whom he had worked continuously for the previous 25 years. With his passing the nation lost a pioneer forester, one who had served with distinction both forestry and the Society of American Foresters. Years before his death the Society had recognized Dr. Cary's attainments by electing him a Fellow (1924). However, the truth of the matter was that Austin Cary had been a "first in so many phases of forestry that only upon his death did the magnitude of his achievements assume their full proportions. His achievements are further enhanced when one reflects upon the basic character of the man himself: his innate simplicity, his directness, and his lack of pretension."

The Austin Cary Memorial Today. Director Emeritus Harold S. Newins of the Florida School of Forestry stands among the grove of 71 slash pines sheltering the granite and bronze memorial to a pioneer American forester.

Born in Maine in 1865 (*20*) where logging and lumbering were then as now important industries, Cary (*4*) by his own admission grew up without knowing there was such a word as forestry. It was not until 1892, he recalled, that he heard of the subject and then he was 27 years old, had earned two degrees at Bowdoin College, and had done several years of graduate work at Johns Hopkins and Princeton Universities (*4*).

Cary's years of academic study plus his experience gained working in the woods of his native state were to serve him well when he began his first forestry job with the Forestry Division, U. S. Department of Agriculture gathering data on eastern white pine (*19*). More to his liking was a subsequent job for the state land agent of Maine, and the report he made of his findings led to his employment in 1898 by the Berlin Mills, giving him the distinction of becoming the first American forester to be hired by an industrial firm (*4*).

In 1904, after six years with Berlin Mills, he accepted an offer to teach a class in topographic mapping at the Yale School of Forestry (*6*). He repeated this assignment the following year but after that moved to Harvard University as assistant professor of forestry. He spent five fruitful years at Harvard, which culminated in the writing and subsequent publication of his *Manual for Northern Woodsmen:* Later he revised his book and changed the title to *Woodman's Manual*. The fourth and last revision was made in 1932. This revision has gone through four reprintings, the last one in 1947.

With this background of pioneering in industrial forestry and forest education Cary began the third phase of his career, that of public service, when in 1910 he accepted appointment as logging engineer, U. S. Forest Service (*10*). First in the Northwest, but largely in the southern states, Cary was to assist forest land owners for a

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quarter of a century.

Did he realize when he made his first trip through the southern pine belt in 1917 that he was to pioneer in a new field? Although he was 52 years old at that time the years ahead were to become most productive as many have said that Cary's greatest achievement was "selling" forestry to the land owner, the businessman, and the industrialist of the southern states (*11, 12, 14, 22*).

Cary was credited with being a teacher, a public servant, and the first American forester to be employed by American industry (*1, 6, 7, 8, 9, 13, 17, 23*). These accomplishments are in the record. In addition to these attainments he was above all a practical man and a man with unlimited faith in what could be accomplished through the frame-work of American ingenuity and enterprise. As Cary had said, "I was in this forestry business from the start, when it was almost strictly an ideal. I took it that way for a time myself, but soon came to see that a shift of ground would promise better results, a mixing of the general idea with the affairs and interest of our people." (*4*).

Dr. Cary's presence on the campus of the University of Florida at the time of his death, plus his interests and efforts on behalf of forestry education in Florida, led Professor Newins of the School of Forestry to inaugurate such steps as were within his power to perpetuate the memory of Austin Cary. A first move was to petition the Board of Control of the University of Florida to name the recently acquired school forest the Austin Cary Memorial Forest.

But this was not enough. Dr. Cary had been active and eminent in his profession and the spontaneous feeling arose among many members of the Society that Austin Cary's life and work should be commemorated. As would be expected, this feeling was strong in the South where Dr. Cary had lived and worked for years. Consequently, the Southeastern Section of the SAF appointed a committee to look into the matter of developing a suitable memorial. T. A. Liefeld, who at that time was an employee of the U. S. Forest Service at Lake City, Florida, was named chairman of the committee. The Southeastern Section's efforts were strengthened immeasurably when the parent Society voted at its annual meeting in Portland, Oregon, in December 1936, to establish a memorial to Austin Cary.

In accordance with the wishes of the Society, President H. H. Chapman appointed an Austin Cary Memorial Committee as follows: C. H. Coulter, Tallahassee Florida; A. B. Hastings, Washington, D. C.; Ernest F. Jones, Bangor, Maine; A. E. Wackerman, New Orleans, Louisiana; John B. Woods, Washington, D. C.; and H. S. Newins, Gainesville, Florida. The committee was authorized to act on behalf of the Society and the friends of Austin Cary. Within a year of Dr. Cary's death, a nationwide effort to honor him had developed. Although this effort was sustained on the broadest possible base, including both professional foresters and friends of Dr. Cary's, the Society of American Foresters remained the driving force and the focal point that brought all interests together.

The Society committee investigated all aspects of a memorial before choosing a location and drawing up a plan for its erection at the entrance to the Austin Cary Memorial Forest, Gainesville, Florida. The plan was simple and eminently suitable (*18*). It provided for a bronze plaque on a large boulder, the boulder to be placed in a planted grove of 71 slash pine trees, centered in a ten-acre, park-like area at the entrance to the forest. In building the memorial native materials were to be used, except for the granite boulder, which was transported from the vicinity of East Machias, Maine, Dr. Cary's birthplace.

Execution of the plan depended upon funds donated by friends of Dr. Cary, both within and without the Society, and the work progressed as donations were received. By January 1939, the essential form of the memorial had taken shape. Roads had been built, markers erected at the entrance and along the highway, the granite boulder had been received from Maine, and the bronze plaque attached thereto. Appropriately enough, the wording on the bronze plaque was prepared by T. A. Liefeld now of Thomasville, Georgia. Mr. Liefeld had been chairman of the original Austin Cary Memorial Committee of the Southeastern Section of the Society. The inscription reads as follows:

DR. AUSTIN CARY
1865-1936

THE SOCIETY OF AMERICAN FORESTERS AND FRIENDS OF DR. AUSTIN CARY HAVE ERECTED THIS MEMORIAL IN DEEP APPRECIATION OF HIS UNENDING INTEREST AND EFFORT TOWARDS THE PROMOTION OF SOUND FORESTRY PRACTICES IN THE UNITED STATES.

The memorial was dedicated January 14, 1939. Two years and one month had elapsed since the Society had approved the project. G. H. Lentz (now deceased), chairman of the Southeastern Section, presided. He introduced W. T. Neal (*14*), president of the Southern Pine Association, and A. B. Hastings (*11*), U. S. Forest Service. Both spoke briefly, eulogizing the life and work of Austin Cary. After their remarks, H. S. Newins (*16*), chairman of the Austin Cary Memorial Committee, thanked the many people who had worked on the memorial and expressed to all who had contributed. C. F. Korstian, at that time president of the Society of American Foresters, then presented the memorial to the University of Florida for maintenance and upkeep (*13*). On behalf of the university, its president, Dr. John J. Tigert, accepted these responsibilities (*21*).

Dean Korstian's remarks at time of presentation are worthy of note. He said in part, "It is with genuine satisfaction, President Tigert, that I turn this splendidly conceived and executed memorial over to the University of Florida for safe-keeping for the Society of American Foresters and friends of

Austin Cary. May it ever be a reminder, especially to those of us so fortunate to have known him personally, that the good work started by him must go on, and a reminder of future generations that Austin Cary was one of forestry's most sincere and successful pioneers and that the world is richer for his having lived and labored in it."

IN RETROSPECT it seems clear that Austin Cary, as much as anyone else, realized what an expanding forest economy would mean to the South and the nation. More than anyone else he had faith and confidence in the American people and their institutions. His faith and confidence were based on the solid foundation of a life-time of experience and work throughout the United States. This had led him to the conviction that maximum progress in forestry would come about "With a mixing of the general idea with the affairs and the interest of our people."

This was Cary's work. How far he progressed along the way may never be known. But we know this: many people have evaluated his achievements highly. As for his commentary, Austin Cary, with all due modesty, was content to say, "I have lived in good times." (*5*).

Literature Cited

1. ANONYMOUS. 1941. A list of materials in the Austin Cary Memorial Forestry Collection in the University of Florida. The Florida Historical Records Survey, Division of Community Service Programs, Works Projects Administration, Jacksonville. 96 pp.
2. ————. 1936. Austin Cary, 1865-1936. Jour. Forestry 34:623.
3. ————. 1958. Distribution of age groups in forestry indicated by sampling. Jour. Forestry 56:157.
4. CARY, AUSTIN. 1935. Forty years of forest use in Maine. Jour. Forestry 33:366-372.
5. ————. 1936. Common sense in conservation. Jour. Forestry 34:234-243.
6. CHAPMAN, H. H. 1936. Austin Cary, 1865-1936. Jour. Forestry 34:624-625.
7. GREELEY, WILLIAM B. 1950. Industrial forestry. In Fifty Years of Forestry in the U.S.A. Society of American Foresters, Washington, D. C. pp. 238-259.
8. ————. 1951. Forests and men. Doubleday and Co., Inc., Garden City, N. Y.
9. ————, 1955. Austin Cary as I knew him. Amer. Forests 61(5):30.
10. HASTINGS, A. B. 1935. Austin Cary retires. Jour. Forestry 33:820-821.
11. ————. 1939. Appreciation of Austin Cary. Jour. Forestry 37:287.
12. HEYWARD, FRANK, JR. 1955. Austin Cary, Yankee peddler in forestry. Amer. Forests 61(5):29-30, 43-44 and 61(6):28-29, 52-53, illus.
13. KORSTIAN, C. F. 1939. Acceptance of memorial and transfer of its custody to the University of Florida. Jour. Forestry 37:290-291.
14. NEAL, W. T. 1939. Rambling thoughts on the activities of the late Dr. Austin Cary. Jour. Forestry 37: 288-289.
15. NEWINS, H. S. 1937. The Austin Cary memorial. Jour. Forestry 35: 624-626.
16. ————. 1939. Presentation of the Austin Cary memorial to the Society of American Foresters. Jour. Forestry 37:290-298.
17. ————. 1941. The life of Austin Cary. A list of materials in the Austin Cary memorial forestry collection in the University of Florida. Florida Historical Records Survey, Division of Community Service Programs, Works Progress Adm., Jacksonville 1-49.
18. REINSMITH, W. H. 1937. The plan for the Austin Cary Memorial. Jour. Forestry 35:626-627.
19. RODGERS, A. D. 1951. Bernhard Eduard Fernow. A story of North American forestry. Princeton University Press, Princeton, N. J.
20. SMITH, H. A. 1936. Austin Cary 1865-1936. Jour. Forestry 34:623.
21. TIGERT, JOHN J. 1939. Acceptance of the custody of the Austin Cary memorial. Jour. Forestry 37:291.
22. WACKERMAN, A. E. 1935. Letter from A. E. Wackerman, forester, Southern Pine Association, to Raymond J. Hoyle, professor of forestry, New York State College of Forestry. Jour. Forestry 33:890-891.
23. WATTS, LYLE F. 1950. The U. S. Forest Service. In Fifty Years of Forestry in the U.S.A. Society of American Foresters, Washington, D. C. pp. 165-191.

Booklets on Douglas-fir Available in Italian

Professor Aldo Pavari, head of the Forest Experiment Station at Firenze (Florence), Italy has kindly provided for interested American foresters copies in Italian of three studies made by him of Douglas-fir.

The papers are based on data collected by Prof. Pavari during a tour of the United States twelve years ago. They were published in the review *Monti e Boschi*. The reprints are illustrated and are bound in paper covers.

As long as the supply lasts, requests for the publication will be filled in order of receipt (one to a person, without charge), by the Society of American Foresters, 425 Mills Building, Washington 6, D. C.

Notes and Observations

The Difference Between a Forest Yield Tax and a Forest Severance Tax

The Division of Economics and Policy, Society of American Foresters, at its meeting in Syracuse, New York, November 12, 1957, requested that a statement be prepared to (1) clarify the distinction between a forest yield tax and a forest severance tax, and (2) provide a rationale for making such distinction. The Division at its meeting in Salt Lake City, Utah, September 30, 1958, accepted the statement that follows with the recommendation that it be printed in the JOURNAL OF FORESTRY.

Distinction Between Forest Yield and Forest Severance Taxes

As stated by Fairchild and Associates in *Forest Taxation in the United States* (USDA Publ. No. 218, p. 416, 1935):

> The term "severance tax" is a collective one embracing several types of tax applied specifically to natural resources, such as minerals, gas, oil, timber, and the like, at the time of their severance from a state of nature. . . . Whatever the form of tax, it will fall into one or the other . . . of two general categories, namely, those levied in whole or in part in place of the ordinary property tax and those levied in addition to the property tax.

The term "severance tax," as indicated in the quotation, is a collective one and is so defined in *Forestry Terminology* (3rd ed. 1958, page 86) as "a tax upon the removal of timber or other natural resources." In practice, however, it is not customary in a forestry context to use the term "severance tax" in this collective sense but in a more limited one. A distinction is made between the two types of severance tax by referring to those levied *in place of* the property tax as "yield taxes" and reserving the term "severance tax" for those levied *in addition to* the property tax.

A parallel from the field of botanical nomenclature may serve to illustrate the point. The term "pines" may be used either in the collective sense to indicate the family Pinaceae or it may be used in the limited sense to indicate the genus Pinus. When used without some qualification indicating that the collective sense is intended, however, the term "pines" like the term "severance tax" ordinarily carries the more limited meaning.

In addition to the basic distinction already noted, a number of other differences between yield and severance taxes are noted in Table 1.

TABLE 1.—DIFFERENCE IN YIELD SEVERANCE TAXES[1]

	Forest yield tax	Forest severance tax
Primary purpose	To aid forestry by eliminating the annual tax on timber and substituting a tax at time of harvest	To obtain additional revenue (proceeds may be devoted to state forest program)
Basis of payment		
Timber	Usually ad valorem, e.g., 10 percent of stumpage value	Usually specific, e.g., 50 cents per M bd. ft.
Bare land	Remains subject to the property tax, sometimes in modified form, or to a specific tax per acre	Not affected
Responsibility for payment	Rests upon the timber owner	Rests primarily upon the timber operator
Action needed by the owner to classify forest land under the law	Required under optional laws	Never required
Nature of tax	Gross income tax	License tax for the privilege of severing a natural resource from a state of nature
Use of revenue	Generally devoted to the support of local government as in the case of property taxes	Generally devoted to furthering the forestry program of the state

[1]Material adapted from State Forest Tax Law Digest—1956, page 7.

Rationale for Yield and Severance Taxes

Yield taxes are adopted as an encouragement to forestry by deferring the annual property tax on timber until funds become available at time of timber harvest. Severance taxes on the other hand are adopted as revenue measures, and serve as an aid to forestry only to the extent that the revenue derived is applied to forestry purposes. Fourteen states now have yield taxes and six states have severance taxes. Three states (Alabama, Louisiana, and Oregon) have both a forest yield tax and a forest severance tax. The distinction between yield and severance taxes is thus a valid one and in accord with the actual facts.

Even though at times used interchangeably and without regard to the distinctions noted above, the literature both of forestry and of taxation recognizes the difference between the two forms of tax. On the forestry side this is true of the Fairchild Report, the State Forest Tax Law Digest, and various federal and state forest tax studies. On the tax side, the distinction is observed in publications of the Commerce Clearing House, notably "Tax Systems" in a report entitled *State Taxes on Natural Resources* published by the Federation of Tax Administrators (1951) and the *Assessment Terminology*

published by the National Association of Assessing Officers (2nd ed., 1956).

We believe that effective communication in forest economics and in forest policy will be facilitated and that confusion will be avoided if the basic difference between "yield" and "severance" taxes continues to be recognized. We accordingly recommend that the distinction be maintained and that the Division of Economics and Policy re-affirm such distinction as follows: *a tax upon the cutting of timber should be termed a yield tax if it is imposed in place of the property tax and as a severance tax if it is imposed in addition to the property tax.*

R. CLIFFORD HALL
ALF Z. NELSON
ELLIS T. WILLIAMS,
Chairman, Special Subcommittee

Hurricane Damage Related to Thinning Intensity in East Texas Slash Pine Plantations

In the spring of 1941 and 1942, the Kirby Lumber Corporation established a series of experimental slash pine (*Pinus elliottii* Engelm. var. *elliottii*) plantations on cutover longleaf pine land in Hardin, Jasper, and Tyler Counties, East Texas. These plantations were each subdivided in the fall of 1956 and subjected to three intensities of thinning. On June 27, 1957, four of these plantations were in the path of Hurricane "Audrey." An examination following the hurricane indicates that hurricane damage to these experimental plantations was related to thinning treatment.

The New Orleans office of the Weather Bureau, U. S. Department of Commerce, estimated that these plantations experienced northwest winds of 72 miles per hour with gusts to 86 miles per hour during the hurricane. All the plantations were within 10 to 20 miles of the western edge of the hurricane eye.

The thinnings in 1956 removed diseased, crooked, forked, and poor risk trees. In effect, they were thinnings from below. Plantation data, thinning data, and damage by Hurricane "Audrey" are shown in Table 1. The data clearly indicate that damage by "Audrey" was much heavier in heavily thinned stands than in those with a light thinning. In fact, there was a direct relationship between the degree of thinning and the number of trees and basal area severely damaged.

In addition to the trees severely damaged and removed from the plantations, a number of trees are still badly leaning as a result of the hurricane. In some of the plantations there are as many additional trees leaning as those removed. Again, this class of damage was directly related to the degree of thinning, i.e. the heavier the thinnings the heavier the damage. In one plantation, 59 out of 312 trees per acre (19 percent) in the heavily thinned plot were damaged.

Several other observations with reference to damage by this hurricane were noted. Many of the damaged trees broke at cronartium galls on the bole. In the heavy and medium thinned plots, more crown damage, i.e. limbs and small branches broken off and needles and bark whipped off, was observed than in the light thinning. Damage was severest in the larger diameter trees within each thinning intensity. The larger diameter trees tended to windthrow or break; the smaller diameter trees tended to sustain a severe lean without windthrowing or breaking. Our past experience with dead and dying trees in plantations of these size classes indicates that Ips beetle build-up in such areas can cause as much mortality as that occasioned by the hurricane itself, if adequate control measures are not initiated immediately.

This particular case history perhaps would have shown less damage if the winds had followed a later thinning or if the plantations could have had sufficient time for partial or complete crown closure to occur following thinning.

Of course, the risk of hurricane damage is only one of the factors to be considered in thinning Coastal plantations. However, the experience with these experimental plantations is sufficient to point out that the possibility of hurricane damage should be given serious consideration in formulating plantation thinning policy within the Coastal Plains hurricane belt.

TABLE 1.—DESCRIPTION OF SLASH PINE PLANTATIONS, THINNING DATA, AND DAMAGE BY HURRICANE "AUDREY"

	Degree of thinning per acre		
	Light	Medium	Heavy
Average number of trees before thinning	580	547	584
Average number of trees after thinning	471	376	304
Average percentage of trees removed	18.4	30.8	47.5
Basal area after thinning	92.0	74.4	65.4
Average number of trees severely damaged by Hurricane "Audrey"	6.0	11.4	17.2
Average basal area severely damaged by Hurricane "Audrey"	1.5	2.8	5.2

THOMAS C. NELSON
and GEORGE W. STANLEY
Kirby Lumber Corporation, Houston, Texas

BIG NEWS UP

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What's more, this GM engine develops 10 per cent more power—boosting the work capacity of the "440" Diesel Crawler even beyond that of previous gasoline-powered models. This unit opens up new opportunities for cutting costs, saving work and time on nearly every type of logging work. For loggers who have been wanting Diesel power in a John Deere Crawler, this new "440" meets every requirement. And remember, John Deere builds matching equipment for every logging operation.

Here, a John Deere "440" winches out a fallen tree between two others saved for later harvest. Its ability to work in tight spots such as this has won high acceptance for the "440" in all logging areas. Increasingly, this economical crawler is the choice for all types of logging jobs.

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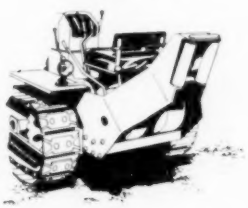

Low in cost, this rugged John Deere Integral Log Arch greatly increases the work capacity of the "440," and preserves high maneuverability. The heavy-duty John Deere Trailing Log Arch is available for handling larger logs.

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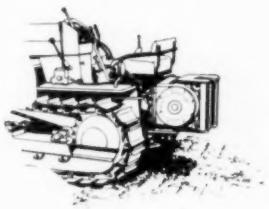

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A Low-Cost Deer Fence

Deer-proof fences have been in use for many years. Small exclosures have been used by foresters to protect experimental plots and to demonstrate the effects of deer browsing on plantations and natural seedlings. Large exclosures have probably been used more often to protect farm crops than forest land. No doubt the relatively high cost of deer-proof fencing has discouraged its large-scale use in forestry.

Costs have varied greatly. Clepper[1] reported an average cost of $16 per chain for erecting deer-proof fence in 1931; costs for the same type of fence today would be considerably higher. An "outrigger" type of deer fence described by Blaisdell and Hubbard[2] in 1956 cost $66 to $132 per chain.

In 1952, three 1/20-acre exclosures of 8-foot fence were built on the Pocono Experimental Forest, near Gouldsboro, Pennsylvania, by the Northeastern Forest Experiment Station at a cost of $41.48 per chain. However, in 1956, a 4.7-acre clearcut strip was enclosed with 8-foot fence on the Pocono Forest for $18.15 per chain. This note describes the erection of the comparatively low-cost fence for the larger exclosure.

A breakdown of costs per chain for the two Pocono fences is shown below, both adjusted to 1956 prices.

	1/20-acre exclosures	*4.7-acre exclosure*
Materials	$14.25	$10.06
Labor	27.23	8.09
Total	$41.48	$18.15

As shown, labor made up most of the difference in costs. Labor rates were $1.77 an hour for a foreman, whose time was 29 percent of the total in both instances, and $1.42 an hour for other workmen.

The key to reducing costs on the larger exclosure was the use of living trees in place of fence posts wherever possible. This meant the acceptance of spans up to 40 feet or more between supports where no suitably located trees at closer spacing were available. By using trees, both the job of setting posts and the costs for posts themselves were reduced to a minimum.

Only 20 posts were used in the entire perimeter of 34.5 chains. Labor was reduced from 17.9 man-hours per chain on the small exclosures, where few trees were used and spans did not exceed 20 feet, to 5.3 man-hours per chain on the larger one, where less rigid specifications were followed.

Before construction began, the trees to be used as fence supports were blazed. The next job was to clear the line; slash and saplings were removed, and overhanging limbs were pruned from a strip about 5 feet wide. Used railroad ties (creosoted) were set at two corners where no suitable trees were available. Four butt-treated 10-foot posts cut from chemically debarked trees were set at other turns in the fence where there were no standing trees. Metal posts were driven into the ground on straight sections of the fence where the distance between supporting trees ran well over 40 feet.

Sawmill edgings were nailed to the trees and the fence was stapled to the edgings. This was done to simplify removing the fence, since plans call for future removal to

[1]Clepper, Henry E. The deer problem in the forests of Pennsylvania. Pa. Dept. Forests and Waters, Bul. 50, 45 pp. 1936.

FIG 1.—Use of standing trees for fence supports cut the costs of this deer-proof fence on the Pocono Experimental Forest in Pennsylvania.

[2]Blaisdell, James A. and Richard C. Hubbard. "An outrigger" type deer fence. U. S. Forest Service, Calif. For. and Rge. Expt. Sta. Forest Res. Note 108, 3 pp. 1956.

FIG. 2—Close-up of the fence. Sawmill edgings were nailed to the trees, and the fence was stapled to the edgings.

another strip. Wiring the edgings to the trees was tried but was found unsatisfactory.

Two widths of 4-foot galvanized steel fencing, with a 6-inch stay-wire spacing, were used. Top and bottom strands are 10 gage and all others 12½ gage. The fencing was unrolled down the line by two men carrying it on a pole. The use of trees for supports resulted in a slight bend in the fence at almost every tree. The fencing was always placed on the outside of the bend so that the pull would be against the trees. This is important in the maintenance of the fence.

The top strip of fencing was put up first. The following method was found best. One man, going ahead down the line (one or two trees ahead), pulled the fencing tight. To do this, he wove a 4-foot stick vertically through the fencing for a fence-gripper, and, using a metal fence post as a lever, pried against a tree to pull the fencing tight. A second man, using a stout stick, held the fencing at the proper height, while a third man stapled it to the edging on the tree used as a post.

The bottom strip was then put up and fastened to the top strip. Two gates were cut in the bottom strip at opposite corners of the exclosure. Finally, all gaps under the fence were filled with limbs, logs, or rocks. Figures 1 and 2 show the type of construction used.

After the fencing is removed, trees used as fence posts will be killed to prevent damage to saws by embedded nails. Even the best of the trees that were used are worth more as posts than they would be as sawlogs.

Under different conditions, costs might be even less than on this job. For one thing, the area had been clearcut and a great deal of slash along the fence line had to be removed. This slash removal amounted to about 20 percent of the total erection time. If a fence were put up in an uncut stand, there would be very little line-clearing to do; in partially cut stands, the amount of this work would be intermediate.

A fence not slated for removal could be stapled directly to the trees, thus eliminating the time required to put up edgings. Fencing with 12-inch stay wires, costing about 70 percent as much as the 6-inch type, could probably be used, especially where the fence need not be in place for many years.

Even at the comparatively low rate of $18.15 per chain, the cost per acre protected is very high for small areas. However, the cost per acre decreases rapidly as area increase. For example, the per acre cost for the 1/20-acre plots was $1,089: for the 4.7-acre strip the cost was $133. But a square 40-acre block could be fenced for $36 per acre, and a 250-acre block for $14.52 per acre. This compares favorably with the planting and stand-improvement costs commonly invested in forest land. Therefore, such erection costs are not unreasonable if they insure stand reproduction.

TED J. GRISEZ
Forester, Northeastern Forest Experiment Station, Forest Service, U.S. Dept. Agriculture

The Ampliscope—an Instrument for Wood-Fiber Measurements

In studies involving wood fibers, the intensity of sampling is often limited by the time required to measure fiber lengths under the microscope. The ampliscope shown in Figure 1 was constructed to facilitate wood fiber measurements in connection with research at the Southern Institute of Forest Genetics, but it has other obvious uses, as in tracing outlines from or rapidly inspecting slides. It employs a standard reflecting principle that permits the use of relatively inexpensive components.

For fiber measurements, wood samples are macerated, stained, and mounted on microscope slides. A water-soluble mounting medium is used to avoid twisting and shrinking of the fibers by dehydration.[1] The slides are placed in a slot at one side of the instrument, which projects them onto a screen, from the rear, at 25X enlargement. At this magnification, intact fibers of the southern pines are readily distinguishable from fragments and incomplete sections. The operator sits facing an inclined screen and measures fibers with a transparent scale placed in any position on the screen. As the screen is 19 inches square, about half of the usable area beneath a 22- by 44-millimeter cover slip is projected at one time.

FIG. 1.—The ampliscope.

Figure 2 shows construction details. Illumination is provided by a T-8 projection bulb of 150 or 300 watts. Light is directed through a pair of 2-inch condenser lenses (3¼-inch focal length), with a high-grade mirror diverting the rays toward the slide aperture. The lower condenser is placed immediately above the slide channel. A triple-element, coated anastigmat projection lens is mounted in a box frame. The focal length should be approximately 3½ inches; a good camera lens is adequate. Focusing is accomplished with a simple lever and threaded rod. The lever is a length of 14-inch ply-

[1] Echols, Robert M. Variation in tracheid length and wood density in geographic races of Scotch pine. Yale Univ. School Forestry Bul. 64, 52 pp. 1958.

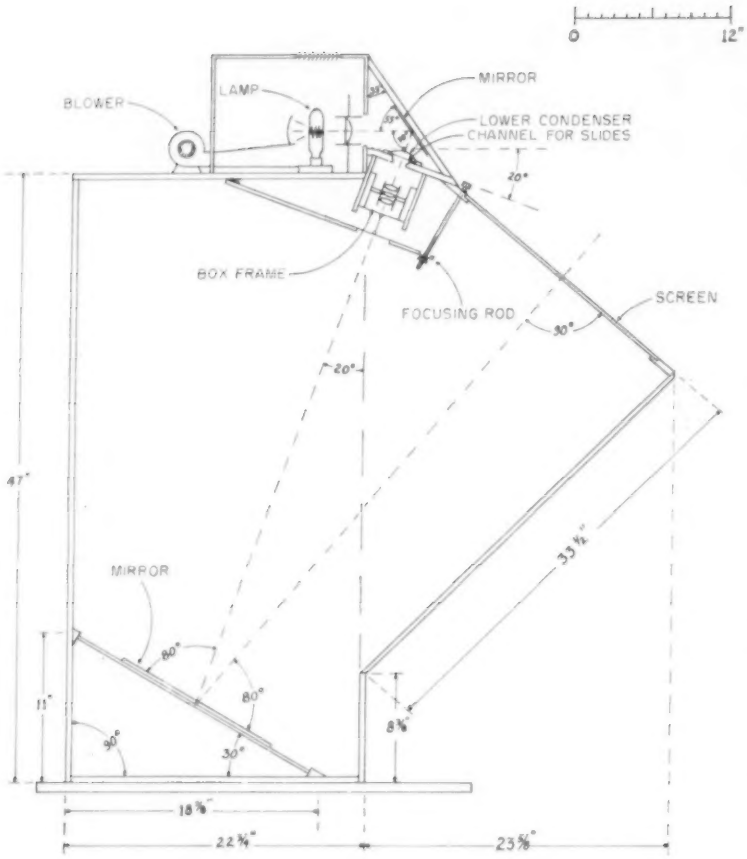

FIG. 2.—Construction details.

wood with an opening opposite the lens. The image is reflected from a high-grade mirror onto the under surface of the screen. A good plate-glass mirror may be used, but a first-surface mirror is more satisfactory. The screen is a square of flashed opal glass. Opal glass is preferred to ground glass because it reduces eyestrain during prolonged use.

If a lamp stronger than 150 watts is used, a cooling system is necessary. A blower may be mounted to deliver a current of air through the lamp housing.

The cabinet is of ⅜-inch plywood. The slide carrier is of ¾-inch plywood, with a 1-inch channel to accommodate microscope slides. A strip of hard-surfaced plastic laminate may be glued to the bottom surface of the channel to ensure easy movement of slides.

An earlier version of the amplifiscope was used in measuring the lengths of more than 153,000 Scotch pine fibers.[1] The average time for measuring and recording 50 fibers from one slide was less than two minutes.

R. M. ECHOLS
Southern Forest Experiment Station, Forest Service, U. S. Department of Agriculture

Points of View

Amendment of Public Law 387 Proposed

Public Law 387 provides a means for states to acquire recreation land from the Bureau of Land Management. They can only acquire up to 640 acres per year, and they must pay for the land.

The Bureau of Land Management has no recreation program and many of our great recreational and scenic, historic features are being damaged and destroyed. If we do not do something about them, within ten years we will lose the value of a lot of this great heritage. We have some fabulous archeological resources, some wonderful geological formations, and some of the most outstanding scenic attractions in the world in southern and eastern Utah, and I have been shocked to learn how much damage has occurred to these areas as a result of lack of a program with a strong policy of protection, development, and management.

In July 1958 I went to Washington, D. C. to discuss this problem with the Department of Interior. I met with Roger Ernst and Conrad Wirth, members of the Bureau of Land Management, and the Utah Congressional delegation. Mr. Ernst stated that he was agreeable to amending the law to cut out the acreage limitation and to make qualification of the area for state park purposes as a limiting factor rather than acreage. It was my understanding that he felt the cost should be eliminated; that if the states were willing to take over these areas and manage them, protect and develop them, the federal government should give these areas to the states for state park use.

Therefore we need the following changes:

1. Make qualification of land for state park purposes the only requirement, with no acreage limitation.

2. Transfer this type of land to the state for state park and recreation purposes, but not to other subdivisions without cost. The Secretary of Interior would hold a reign on these lands for 25 years as indicated in the present act to make certain that the states use them for state park purposes and not for some other use.

3. Withdraw from entry, at the request of the state, tracts which qualify for state park use and hold for state parks for as much as twenty years or more, until the states can find funds to develop and protect these areas. This would not eliminate prospecting for minerals, but would only refer to the surface title to the land.

4. Eliminate the 18-month provision which would be accomplished if No. 3 were considered favorably.

5. Retain power of the Secretary of Interior to cancel the withdrawal of the title if land is not used for public purposes.

We expect to have a bill before the Congress next session.

C. J. Olsen
Director, Utah Park and Recreation Commission, Salt Lake City

Suggested Change for Transplant Symbol

Although I may be rated as a conservative, that is having some reluctance to change our long established terminology just to be changing, I believe that our professional colleagues in Great Britain really have a clearer, more logical and, I believe, better way of expressing the age class of nursery-grown transplant stock than our American method.

Instead of using a minus sign or a hyphen, as some might well call it, for example 2-1 for young trees grown two years in a seed bed and one year in a transplant bed, our British friends use a plus sign clearly indicating that the planting stock is three years old; two-year-old seedlings *plus* an additional year in a transplant bed or "2+1" transplants. Isn't this designation sufficiently clearer and more logical than ours to warrant suggesting its adoption and advocacy for national as well as international use?

C. F. Korstian
Professor emeritus of silviculture, Duke University

A Caution Regarding Pine Pollen

I would like to bring to the attention of foresters, particularly tree breeders, a recent report[1] linking pine pollen to the tuberculosis like disease, sarcoidosis.

There is a similarity in the geographic distributions of the disease and the forested regions of eastern United States. This led the authors of the report to systematically investigate forest-associated products in an attempt to elucidate the etiology of sarcoidosis. They discovered that pine pollen had an acid-fast lipid fraction and an amino acid similar to e-diamino pimelic acid —chemical constituents similar both to substances found in tubercle bacilli and in the human lesions which characterize sarcoidosis. Furthermore, when the authors injected pine pollen into guinea pigs and rabbits, the formation of sarcoidosis-like lesions was induced.

These findings suggest to me that reasonable precautions be

[1]Cummings, M.M. and P.C. Hudgins, Chemical constituents of pine pollen and their possible relationship to sarcoidosis. Amer. J. Med. Sci. 236:311 317, 329. 1958.

taken to avoid unnecessary contact with pine pollen until such time as its innocuous nature can be demonstrated. It would perhaps be desirable to wear face masks during pine breeding operations.

ARTHUR H. WESTING
Yale School of Forestry

On JOURNAL Articles

The JOURNAL OF FORESTRY, in my opinion, contains too many uninteresting and dull technical articles. For instance, the October issue contained 9 articles, of which 7 were written by research station personnel, one by a professor and a graduate student, and only one by an industry forester. Granted that research is important, why not just give the results or final answers instead of the entire experiment? Those interested in any special research problem, which are usually of sectional interest only, should be advised in the JOURNAL where the complete papers may be obtained.

The back of the JOURNAL containing Points of View and Forestry News receives, in my estimation, the most attention from the average forester. He is naturally interested in who is doing what, where, and how. News sources are scarce in our profession and the JOURNAL is about the only way we know what is going on in the forestry world.

Articles on industry's programs, actual watershed management, and lumber operations would be of more general interest to the average forester than some of the material now published. A correspondent assigned to each Section (at no fee or payment) to report on the interesting and working programs in his area would be one way of varying the contents of the JOURNAL. These articles probably would not be written as smoothly or be as finished as those prepared by foresters part of whose job is writing, but at least they would be read by the majority of foresters.

HARVEY R. FRANTZ
Bethlehem, Pa.

A Quote Regarding Wilderness

William R. Brown in his recent text, *Our Forest Heritage*, a history of New Hampshire forestry in a state outstanding for its mountain scenery and for the importance attached to recreational developments, on page 181, has this to say regarding the question of wilderness and natural areas:

"The mistaken idea sometimes followed by would-be conservationists of preserving wilderness areas unattended for the protection of mountain scenery and similar purposes, accompanied by the exclusion of trampers, while not as dangerous as clear cutting with no provision for future growth, defeats its purpose. The maintenance of a healthy growing forest is dependent on the removal of dead, dying and down trees that breed insects and other pests to attack that owner's healthy trees and the trees of others. Also a forest that is interlaced with fire lanes to allow access to travelers and fire fighters, and where the underbrush is cleared up is far safer as a fire risk and more sure of a long life. With human nature as it is, well kept forests that yield a regular income to future owners as a good investment, are far more sure of a happy old age."

W. R. Brown was a member of the New Hampshire Forestry Commission for over 40 years, a longer period than that of any similar state forestry official.

H. H. CHAPMAN
Yale School of Forestry

Short Course in Genetics Offered at University of Washington

The Western Forest Genetics Association announces a two-day course in forest genetics to be offered March 5-6 under the auspices of the College of Forestry, University of Washington, Seattle.

The purpose of the course is to give professional foresters an opportunity to become generally acquainted with the aims, methods, potentialities and limitations of forest tree improvement and the application of genetics in forest management. No background in genetics is required or necessary.

Enrollment in the course should be made by February 15th to the Department of Short Courses and Conferences, University of Washington, Seattle 5, Wash.

Book Reviews

American Agriculture: Geography, Resources, Conservation

By Edward Higbee. 399 pp. Illus. John Wiley & Sons, Inc., New York. $7.95.

Dr. Higbee's conservation studies have enabled him to present a thumbnail sketch of some of the basic differences in soil, water, and plant resources existing within the United States. His discussions of the principal agricultural regions are frequently highlighted by including a sample farm conservation plan map with explanation of the integrated uses of the soil, water, and plant resources. "Maps of individual farms and discussions of their management are an important feature of this book. I have visited all of them, walked across their fields, and observed the good management of their operators." His review of the conservation programs being applied on these farms is concise and informative.

This book is designed to create a more intelligent appreciation of the nature and extent of our soil, water, and plant resources, and to foster a desire to make more effective use of them. In the first Chapter—Land Resources and Their Use — Dr. Higbee says: "There is no prospect of human hunger in this nation for generations to come." He also points out that our cultivatable land can be increased by one-sixteenth, while by 1975 our population may increase by two-fifths, therefore ". . . the productivity of our cropland will have to be increased or our diets will gradually become more vegetarian." Other speculations on changes in resource use are thought provoking.

The second Chapter — Climate and Agriculture—and the next one—Soils and Land Capability—both furnish additional introductory materials for the later discussions on special problems of forests, range, and those of selected agricultural regions. The discussion of Soils and Land Capability should be of considerable interest and value to students and workers interested in the land use fields. The brief remarks on soil characteristics, classification, and capabilities are very good.

The two Chapters—Forest and Waters in the West and Multiple Use of Western Forests do not contain much that is new to the professional forest land manager, especially those who have developed an awareness of the watershed value of forest land. The emphasis placed on forests as sources of useable water is just another smoke signal to forest land managers—and their technical arms, the research workers.

Most of America's wood crops are now growing in the agricultural regions. In the future even more of them will be grown there. In those regions, trees are competing with other plants, not just in nature, but even more strongly in the farm economy. It is conservatively estimated that about 140,000,000 acres of land now growing trees could be safely used for the production of cultivated crops —i.e., land capability Classes I through IV. Here the problem is alternative uses, and economics will most often dictate the owner's choice. When trees are placed in competition with other cultivated plants, the factors of labor and capital are introduced, and there nature does not make the choice.

Those foresters who wish to work where the future opportunities are greatest—on private land—will find Dr. Higbee's book an aid to developing a necessary understanding of the agricultural climate.

T. B. PLAIR
Soil Conservation Service

Woods Words: a Comprehensive Dictionary of Loggers Terms

By Walter F. McCulloch. 219 pp. Champoeg Press, Portland 2, Ore. 1958. $7.50.

After an hour of delving into Mac's glossary one can almost smell the trees. How the late H. L. Mencken would have enjoyed it and valued it! For *Woods Words* is in the tradition of *The American Language*, that fascinating three-volume compendium of "American English" which is one of the greatest legacies bequeathed us by the Sage of Baltimore.

Although many of the 4,000 entries in McCulloch's dictionary deal with so-called slang words and phrases, they are authentic figures of speech of a vital industry. These were, and are, the expressions used by a group of skilled American workmen to communicate with each other. The language they evolved was fluid, versatile, and above all earthy. And it is eminently worth preserving.

"This collection," writes Mac in the Preface, "represents an attempt to record some woods words before more are lost." He started collecting them in 1919, and every folklorist and forester with more than a casual interest in timber terminology will be ever grateful that he did.

Doubtless, Mac would be the first person to disclaim any pretension to standing as a philologist, much less as an etymologist. His dictionary, none the less, is a scholarly contribution to the nomenclature of logging and forestry, and indeed to the American language.

As Stewart Holbrook, who contributes a characteristically pertinent and Holbrookian Introduction, prophesies, "*McCulloch on Woods Words* is henceforth a standard reference." Holbrook, who is a

pretty fair manipulator of words in his own right, further recommends that "Some learned society should grant him [McCulloch] a degree for the preservation of a language."

This is a suggestion with which the present reviewer is in complete accord, even though the author already has a perfectly good doctorate that isn't even half worn out. (He prefers to be called "Mac" rather than "Doctor.") Incidentally, as if any American forester has to be told, Walter F. McCulloch is dean of the School of Forestry at Oregon State College.

Published by the Oregon Historical Society and the Champoeg Press, the book is handsomely bound and printed. It would make a most attractive and fascinating gift. Erudition and humor have seldom been so skillfully combined in forest literature.

HENRY CLEPPER

Fundamentals of Soil Science

By C. E. Millar, L. M. Turk, and H. D. Foth. 3rd ed. 526 pp. Illus. John Wiley & Sons, Inc., New York. 1958. $7.75.

Written for a college course in agricultural soil science, the *Fundamentals of Soil Science* presents the principles of soil science in simple, clear language. In some cases this strees on simplification is carried too far and the reader is left with only a vague notion about processes involved. Application of soil science and management is all in terms of agriculture, and some chapters are devoted exclusively to farm practice, e.g. the one on farm manures. For these reasons the book does not have as much interest for foresters as books specifically on the subject of forest soils or including chapters on forest soils.

Introductory chapters on soil materials and soil development are quite good and are applicable to all kinds of soils. General properties of soils are well covered and the material presented is up-to-date. A forester can also get a clear picture of present soil classification principles from Chapter 5.

The chapters on soil organisms and organic matter are good, and the material is applicable to forest soils as well as agricultural soils. The reader can also get a rather complete picture of plant nutrition and fertilizer materials, including sources and use of each fertilizer element.

Principles of conserving soil also merit the attention of the reader. Wildlands have very little place in the discussion but conservation principles are stressed particularly as they apply to agricultural lands.

A chapter on soil resources gives an excellent summary of the land situation in the United States and trends in changing land use, material which is not found in most other soils books.

An added feature of the text is a rather complete glossary. Explanation of most soil terms in common use is included and is a valuable addition to the book for many readers.

Because of the strictly agricultural application this book will not command wide general interest and use among foresters. However, it does present fundamentals of soil science in a readily understandable and interesting language. It should be of interest to any professional land manager who wants to gain an understanding of the basic resource in his management—the soil.

STANLEY P. GESSEL
University of Washington

Publications of Interest

The British Forestry Commission has recently published its seventh edition of *Forestry Practice, A Summary of Methods of Establishing Forest Nurseries and Plantations with Advice on other Forestry Questions for Owners, Agents and Foresters.* The book's objective is to make available to landowners and others concerned with private estates the experience and knowledge gained by the Commission's staff. In the 93-page booklet are discussed nursery work, plantation work, and utilization as well as such miscellaneous information as tools and appliances and the Commission's assistance to woodland owners. Copies may be ordered from Her Majesty's Stationery Office, price 5s. 6d.

* * *

Studies of elementary school conservation education programs in 28 states has resulted in *Conservation Experiences for Children*, a 192-page booklet by Effie G. Bathurst, educational specialist, and Wilhelmina Hill, specialist for social science, was written for elementary school teachers and supervisors, and published by the U. S. Department of Health, Education and Welfare. The booklet is Office of Education Bulletin 1957, No. 16. Copies are available from the publisher for 75c each.

* * *

Forest Industry Educational Materials, a pamphlet published by American Forest Products Industries, Inc., lists and briefly describes a variety of education materials available from forestry-related industries and associations. The listing, which includes booklets, posters, motion pictures, and filmstrips, was published to supplement AFPI's *School Bibliography on Forests* and can be obtained from the association, 1816 N Street, N. W., Washington 6, D. C.

Proceedings of Industrial Forestry Seminars Available

A limited number of copies of the complete proceedings of the March 24 to April 4, 1958, Industrial Forestry Seminar held at Berkeley, Calif. under the direction of the Yale University and University of California Schools of Forestry are available at $7.50. Checks should be made out to "The Regents of the University of California", applications addressed to University Extension, University Extension Building, University of California, Berkeley 4.

The Yale School of Forestry indicates that the complete proceedings of the Seventh Industrial Forestry Seminar, held under its direction at Crossett, Ark., October 7-18, 1957, are available at $6 per copy. Address: Yale School of Forestry, 205 Prospect St., New Haven, Conn.

Yale also has a limited supply of proceedings from earlier seminars: Fourth Seminar (leaders' papers only) October 22-November 2, 1956, at $2.50 per copy; Second and Third Seminars (combined) November 7-18, 1955, and January 23-February 3, 1956, at $6 per copy.

Current Literature

Compiled by MARTHA MEELIG, *Librarian, State University College of Forestry at Syracuse University*

Range Management Section Compiled by NELLIE G. LARSON, *Library, U. S. Department of Agriculture*

General

Of Men and Marshes. By P. L. Errington. 150 pp. Illus. Macmillan Co., New York. 1957. $4.50.

Trees of Idaho. By V. H. Burlison, R. L. Guernsey and F. D. Johnson. 24 pp. Ilus. Univ. of Idaho Agric. Ext. Serv., Moscow. 1958. Bul. No. 289.

Woods Words, a Dictionary of Lumbering and Logging Lingo. By W.F. McCulloch. 230 pp. Illus. Champoeg Press, Portland 2, Ore. 1958. $7.50.

Christmas Trees

Fraser Fir as a Christmas Tree. By W. K. Williams. 9 pp. Illus. U. S. Dept. of Agric. Forest Serv. Ext. Serv., Washington 25, D. C. 1958. 10 cents (Govt. Print. Off.)

Production and Marketing of Christmas Trees in the Pacific Northwest in 1957. By T. C. Adams and M. L. Sylverson. 20 pp. Ilus. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1958.

Conservation

Windbreaks in Conservation Farming. By A. E. Ferber, 22 pp. Illus. U. S. Dept. of Agric. Soil Conservation Serv., Washington 25, D. C. 1958. Misc. Publ. No. 759. 20 cents (Govt. Print. Off.)

Forest Economics

Elementary Statistics for Foresters. By A. J. Nash. 74 pp. Lucas Bros., Columbia, Mo. 1958. $2.

Historical Forestry Statistics of the United States. Comp. by Dwight Hair. 36 pp. U. S. Dept. of Agric., Washington 25, D. C. 1958. Statistical Bul. No. 228.

Forest Products

Pulpwood or Sawlogs? from Small Hardwood Trees. By D. P. Worley. 7 pp. Central States Forest Expt. Sta., Columbus, Ohio. 1958. Tech. Paper No. 156.

Forest Resources

Forest Inventory Statistics for Walker County, Georgia. 18 pp. TVA, Norris, Tenn. 1958. Forestry Bul. No. 61.

Minnesota's Forest Resources. By R. N. Cunningham and others. 52 pp. Illus. U. S. Dept. of Agric., Washington 25, D. C. 1958. Forest Resources Rept. No. 13. 13 cents (Govt. Print. Off.)

Land Use

Land Use in Canada. By V. E. Johnson. 38 pp. Illus. Canadian International Paper Co., Montreal 2, Quebec. 1958.

Logging and Milling

Directory of Wood Industries in Eastern Oklahoma. By E. J. R. Booth and Robert Raunikar. 34 pp. Okla. State Univ. Ext. Serv., Stillwater. 1958. Cir. No. 663.

Sawmills and Lumber Production Western North Carolina Counties 1957. 16 pp. North Carolina Dept. of Conserv. & Devel. Div. of Forestry, Raleigh. 1958.

Pathology

Diseases of Foreign Forest Trees Growing in the United States; an Annotated List. By Perley Spaulding. 118 pp. U. S. Dept. of Agric., Washington 25, D. C. 1958. Agric. Handbook No. 139. 40 cents (Govt. Print Off.)

Heart Rots of Incense Cedar. By W. W. Wagener and R. V. Bega. 7 pp. Illus. U. S. Dept. of Agric., Washington 25, D. C. 1958. U. S. Forest Serv. Forest Pest Leaflet No. 30. 5 cents (Govt. Print. Off.)

Silviculture

Direct Seeding Loblolly Pine in North Louisana. By Thomas Hansbrough and R. G. Merrifield. 4 pp. Louisana State Univ., North La. Hill Farm Expt. Sta., Homer, La. 1958. Hill Farm Facts, Forestry 1. Mimeog.

Effects of Stocking on Site Measurement and Yield of Second Growth Ponderosa Pine in the Inland Empire. By D. W. Lynch. 36 pp. illus. Intermountain Forest and Range Expt. Sta., Ogden, Utah. 1958. Research Paper No. 56.

Germinative Capacity of Engelmann Spruce Seed. By J. D. Curtis. 3 pp. Intermountain Forest and Range Expt. Sta., Ogden, Utah. 1958. Research Note No. 58.

Silvical Characteristics of Balsam Poplar. . . By E. I. Roe. 17 pp. Illus. Lake States Forest Expt. Sta., St. Paul, Minn. 1958. Station Paper No. 65.

Silvical Characteristics of Black Maple. By P. E. Slabaugh. 9 pp. Illus. Lake States Forest Expt. Sta., St. Paul, Minn. 1958. Station Paper No. 65.

Silvical Characteristics of Douglas-Fir. By L. A. Isaac and E. J. Dimock II. 18 pp. Illus. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1958. Silvical Ser. No. 9.

Silvical Characteristics of Northern White-Cedar. . . By R. M. Godman. 17 pp. Illus. Lake States Forest Expt. Sta., St. Paul, Minn. 1958. Station Paper No. 67.

Silvical Characteristics of Port-Orford-Cedar. By G. L. Hayes. 11 pp. Illus. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1958. Silvical Ser. No. 7.

Range Management

Arizona Range Grasses; Their Description, Forage Value and Management. By R. R. Humphrey. 104 pp. Illus. Arizona Agric. Expt. Sta., Tucson. 1958. Bul. No. 298.

California Range Land; an Historico-Ecological Study of the Range Resource of California. By L. T. Burcham. 261 pp. Illus. California Div. of Forestry, Dept. of Natural Resources, Sacramento. 1957.

Improving Sagebrush Ranges for Grazing Use; Progress Report of the Great Divide Experimental Range. By D. F. Hervey. 14 pp. Illus. Colorado Agric. Expt. Sta., Fort Collins. 1958. Gen. Ser. Paper 688.

New Zealand Grassland Association, Proceedings of the Nineteenth Conference held at the Ruakura Animal Research Station, Hamilton, Oct. 15 to Oct. 17, 1957. Wellington, 1957. 134 pp.

Ranchers, Ranges, and Cows. By E. Cornett and Others. 12 pp. Illus. Oregon Agric. Ext. Serv., Corvallis. 1958. Ext. Bul. No. 772.

Sagebrush or Grass. By D. N. Hyder, F. A. Sneva, and W. A. Sawyer. 11 pp. Illus. Oregon Agric. Expt. Sta., Corvallis. 1958. Cir. Inform. No. 590.

Weeds of the Pacific Northwest. By H. M. Gilkey. 441 pp. Illus. Oregon State College, Corvallis. 1957. $6.

Wood Techonolgy and Utilization

Analysis of the Wood-Cutting Process. By N. C. Franz. 152 pp. Illus. Univ. of Michigan Press, Research Engin. Inst., Ann Arbor. $4.

Glue-Line Evaluation Technique for White-Speck Douglas Fir Plywood. By B. S. Bryant, H. D. Erickson and J. D. Blanchard. 14 pp. Univ. of Washington College of Forestry, Seattle 5, 1958. Bul. No. 4. Mimeog.

Revue des Modes d'Utilisation des Forêts du Canada. By J. H. Jenkins. 7 pp. Canada Ministere du Nord Canadien et des Resources Nationales, Ottawa. 1958.

Society Affairs

Coming Events

Northeastern Weed Control Conference

The thirteenth annual Northeastern Weed Control Conference will be held January 7, 8, and 9 at the Hotel New Yorker, New York City.

Inland Empire Section

On January 17 the Inland Empire Section will hold a meeting in Spokane, Wash.

Southeastern Section

The Southeastern Section has scheduled its winter meeting for January 22-23, at Montgomery, Ala.

New York Section

The annual winter meeting of the New York Section will be held January 29-30 in the Hotel Onondaga, Syracuse, N. Y. Theme: "Recent Developments in the Use of Chemicals in Forestry."

Kentucky-Tennessee Section

A meeting of the Kentucky-Tennessee Section is scheduled for January 30-31 at Mamouth Cave, Ky.

Appalachian Section

The Appalachian Section meets February 6-7 in the Wade Hampton Hotel, Columbia, S. C.

Allegheny Section

The Allegheny Section holds its winter meeting February 12-14 in the Warwick Hotel, Philadelphia, Pa.

Ozark Section

On February 20-21 Ozark Section members will meet at the Connor Hotel, Joplin, Mo.

Gulf States Section

Plans have been made for the annual meeting of the Gulf States Section to be held May 7-8, in Tyler, Texas.

Lake States Forest Tree Improvement Conference

The Fourth Lake States Forest Tree Improvement Conference has been scheduled for October 6 and 7, at the University of Michigan, Ann Arbor.

Winter Meeting of D.C. Section

On February 19, the D. C. Section will hold its first full-day formal winter meeting, comparable to those of other Sections. It will be devoted entirely to a program of discussions of four items of immediate and vital importance to the profession. These will include: Stature of the Forestry Profession in the U. S., Current Problems in Government—Forest Industry Relations in the East, The Trend in Forest Inventory Systems, and Views on the Use of Chemicals in Forest Management. Panels of experts will pre-

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729 N. E. Oregon Street
Portland 8, Ore.

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School of Forestry
University of California
Berkeley 4, Calif.

sent these subjects which appear to have real potentials for vigorous debate. A luncheon speaker will present forest industry viewpoints on the place of forest management in the corporate structure. Attendance approaching 300 is anticipated, representing not only the local Section but also nearby Sections. *All Sections are welcome and their members invited to attend.*

Public Information Announcement

The retirement of Newton B. Drury as chief of the Division of Beaches and Parks on April 30, 1959, will create a vacancy in one of the key positions in the California State government. The position has a salary range of $1,050 to $1,200 a month.

The vacancy will be filled by selection from a list of eligibles established by a *nationwide, open, nonpromotional* examination. The position is not under civil service, but is filled by appointment by the Director of the California State Department of Natural Resources on the recommendation of the State Park Commission.

The State Park Commission has contracted with Cooperative Personnel Services of the California State Personnel Board to conduct the recruitment and screening of applicants. There will be no written test.

Candidates must have a minimum of five years of executive experience in park, recreational, or related types of administration. Applications must be postmarked not *later than February 9, 1959.* Further information and an official application form may be obtained from: Cooperative Personnel Services, State Personnel Board, 801 Capitol Avenue, Room 555, Sacramento, Calif.

Seeks Historical Information on "Francis Axe"

The undersigned would appreciate hearing from any reader of the JOURNAL who might furnish any information concerning a make of axe known as the "Francis Axe" manufactured (probably) during the early 1800's by the firm of "Francis and Company of Buffalo, N.Y., manufacturers of edged tools."

JAMES M. FRANCIS, JR.
Project forester,
Bethlehem Steel Corp.,
707 Prospect Ave.,
Bethlehem, Pa.

Lewis L. Simpson (1897-1958)

Lewis L. Simpson, secretary-manager and forester for the Southern Oregon Conservation and Tree Farm Association, Medford, Ore., died October 25, 1958 at the age of 61.

Mr. Simpson joined the U. S. Forest Service in 1931 after more than five years of experience in logging engineering. He held jobs on several national forests in the West until 1941 when he moved to a position at a naval air base in Alaska and later to the Army Corps of Engineers in Portland, Ore.

In 1943 he left government employment and subsequently held several industrial forestry positions. He became secretary-manager of the Southern Oregon Conservation and Tree Farm Association in 1947.

Mr. Simpson studied logging engineering at the University of Washington, Seattle. He was born June 27, 1897 in Chicago, Ill.

Walter J. Quick (1902-1958)

Walter Jacob Quick, Jr., 56, died November 26 in the Naval Hospital, Bethesda, Md., of leukemia.

Born in Indianapolis in 1902, Mr. Quick received the B.S. degree in forestry at Penn State in 1924. He subsequently studied at the Yale School of Forestry, but did not take a degree.

During 1924-1927 he was a junior forester with the U. S. Forest Service, and in the latter year joined the Maryland Department of Forestry. From district forester he rose to the position of assistant state forester and chief forest fire warden.

In 1942 Mr. Quick was appointed to the War Production Board's Lumber and Lumber Products Division as an economist. Subsequently, he served with the Office of Price Administration on forest products price controls.

He went to Italy in 1946 as a forestry consultant to the United Nations Relief and Rehabilitation Administration, and a year later transferred to the Rome headquarters of the Food and Agriculture Organization in the same capacity. On completion of this assignment he went with the Economic Cooperation Administration in Greece, and then with a plywood company in Milan, Italy.

Early in 1958 he was sent by the International Cooperation Administration, a unit of the U. S. Department of State, to Africa. On becoming ill last summer he was flown back to the U. S. Naval Hospital where he was a patient until his death.

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Roy Gifford Pierce (1884-1958)

Roy Gifford Pierce, 73, died September 2, 1958, at his home in Burbank, Calif.

Mr. Pierce had retired from the U. S. Forest Service in 1945. His forestry career began in 1908 when he worked as an assistant in Colorado. After working four years in the Midwest, he worked for the Pennsylvania Chestnut Blight Commission from 1912 to 1913. From that time until his retirement he worked with controls of forest diseases for the U. S. Department of Agriculture, primarily white pine blister rust control in the Southern Appalachians.

Mr. Pierce was born in Norfolk, Nebr., October 22, 1884. He attended the University of Nebraska and received both A.B. and B.S. degrees there in 1907. In 1908 he received his M.S. in forestry from the University of Michigan.

Membership Applications and Advancements

Proposals for admission, advancement, and reinstatement received in the Society office during the month of November are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of February 1959.

Communications from the voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Student Grade

PENNSYLVANIA STATE UNIVERSITY

Marker, J. F.
Meier, G. A.
Nordberg, J. A.
Nutter, W. L.

WEST VIRGINIA UNIVERSITY

Adams, R. W.
Bachaut, J. P.
Henry, E. M.
Kellison, R. C.
Lee, R.
Martin, J. R.
Mateer, P. R.
Mazzotti, C. B.
Meadows, M. B.
Myers, C. C.
Riley, C. E.
Rowan, G. S.
Stalnaker, C. B.
Strawn, G. D.
Wills, J. C.

Blankenship, E. P.
Bucklew, C. F.
Conn, C. K.
Davis, R.
Gaskins, E. A.
Ginn, C. R.
Griffin, E. L.
Hathaway, J. B.
Helvey, J. D.
Hill, R. A.

Member Grade

Barton, W. W., forester, USFS, Upper Darby, Pa. (Reinstatement).

Appalachian Section

Student Grade

NORTH CAROLINA STATE COLLEGE

Lovin, H. G.

Junior Grade

Ruckel, J. M., service forester, Va. Div. of Forestry, Sandston, Va. (Reinstatement).

Member Grade

Barden, C. F., S. C. Forestry Comm., West Columbia, S. C. (Junior 1952).
Boger, H. J., Draper Corp., Swannanoa, N. C. (Junior 1952).
Graham, J. E., S. C. State Forestry Comm., Newberry, S. C. (Junior 1952).
Harms, W. R., graduate student, Duke, Durham, N. C. (Junior 1952).
Hartmann, H. R., forester, W. V. Pulp & Paper Co., Summerville, S. C. (Junior 1952).
Hayes, J. M., Federal Land Bank, Raleigh, N. C. (Junior 1952).
Jackson, J. V., Va. Div. of Forestry, Charlottesville, Va. (Junior 1952).
Kidwell, F. D., consulting forester, Orange, Va. (Junior 1952).
Klawitter, R. A., USFS, Charleston, S. C. (Junior 1952).
Morison, D. W., Champion Paper & Fiber Co., Newberry, S. C. (Junior 1952).
Mueller, H., M. V. Pulp & Paper Co., Summerville, S. C. (Junior 1952).
Reyns, R. G., forester, U. S. Army, Columbia, S. C. (Junior 1952).
Rhett, R. B., S. C. State Forestry Comm., Camden, S. C. (Junior 1952).
Santoro, J. C., forester, Ridgeland, S. C. (Junior 1952).
Shaw, M. N., N. C. Dept. Cons. & Development, Asheville, N. C. (Junior 1952).
Smith, W. W., forester, Union-Bag Camp Paper Corp., Franklin, Va. (Junior 1952).
Sorokach, M. R., forest tech., International Paper Co., Georgetown, S. C.; Pa. State, BSF 1954 (Junior 1954).
Utsey, A. L., owner, A. L. Utsey Pulpwood Co., Mullins, S. C. (Junior 1952).
Welch, W. L., International Paper Co., Burgaw, N. C. (Junior 1952).
Williams, W. H., International Paper Co., Beaufort, N. C. (Junior 1952).
Yeager, H. G., W. Va. Pulp & Paper Co., Abbeville, S. C. (Junior 1952).

Associate Grade

Ripley, T. H., staff specialist, S. E. Forest Expt. Sta., Asheville, N. C.

Central Rocky Mountain Section

Student Grade

COLORADO STATE UNIVERSITY

Baier, G. E.
Outslay, G.
Turner, A. H.

Central States Section

Student Grade

PURDUE UNIVERSITY

Niemeyer, J. D.

Member Grade

Bulgrin, E. H., USFS, Research Sta., Carbondale, Ill. (Junior 1952).
Campen, E. R., farm forester, Ill. Div. of Forestry, Oregon, Ill. (Junior 1952).
Neebe, D. J., USFS, Research Sta., Carbondale, Ill. (Junior 1952).
Olson, C. E., instructor of forestry, Univ. of Ill., Urbana, Ill. (Junior 1952).
Sample, J. L., Manager Woodland, Madison, Ind. (Junior 1952).

Columbia River Section

Student Grade

OREGON STATE COLLEGE

Aulerich, D. E.
Bowdish, D. M.
Gustafson, R. G.
Taylor, L. O.

Junior Grade

Parent, F. G., forester, USFS, Gardiner,

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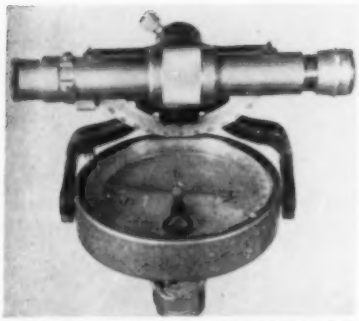

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Ore.; Univ. of Minn., BSF 1958.
Shaner, B. A., forester, Ore. Pulp & Paper Co., Salem, Ore.; Mich. Mining & Tech., BSF 1953 (Affiliate 1956).
Shaw, D. B., timber mgmt. asst., USFS, Ashland, Ore. (Reinstatement).

Member Grade

Dane, C. W., instructor, Ore. State College, Corvallis, Ore. (Junior 1952).
Donovan, W. J., unit forester, Bur. Land Mgmt., Medford, Ore. (Junior 1952).
Horton, B. R., logging eng., U. S. Plywood Corp.; Ore. State, BSF 1954 (Junior 1954).
Houghton, G. V., forester, U. S. Plywood Corp., Eugene, Ore. (Junior 1952).
Hartman, G. B. forester, Bur. Land Mgmt., Portland, Ore. (Junior 1952).
Johnson, R. A., forester, Bur. Land Mgmt., Salem, Ore. (Junior 1952).
Kupillas, E. A., forester, Bur. Land Mgmt., Medford, Ore.; State Univ. of N. Y., BSF 1953 (Junior 1953).
MacLean, C. D., forester, Pacific N.W. Forest & Range Expt. Sta., Portland, Ore.; State Univ. of N. Y., BSF 1950, MF 1951 (Junior 1951).
Madison, W., forester, Bur. Land Mgmt., Salem, Ore. (Junior 1952).
Popp, R. D., forester, Bur. of Indian Affairs, Klamath Agency, Ore.; Iowa State, BSF 1953 (Junior 1953).
Porter, J. S., forester, Ore. State Board of Forestry, Salem, Ore. (Junior 1952).
Russell, R. J., sales office, Cascades Plywood Corp., Portland, Ore.; Iowa State, BSF 1954 (Junior 1954).
Smith, R. E., forester, Ore. State Board of Forestry, Salem, Ore. (Junior 1952).
Williams, C. B., research forester, Pacific N.W. Forest & Range Expt. Sta., Portland, Ore.; Univ. of Mich., BSF 1955, MS 1957 (Junior 1955).

Affiliate Grade

Williamson, R., jr. forester, Umatilla Natl. Forest, Pendleton, Ore.

Gulf States Section

Junior Grade

Byrd, H. L., regional forester, Champion Paper & Fibre Co., Livingston, Texas (Affiliate 1955).
Tanksley, R. D., project forester, USFS, Pontotoc, Miss. (Reinstatement).

Member Grade

Dance, J. E., forester, Lutcher & Moore Lbr. Co., Orange, Texas; LPI, BSF 1951 (Junior 1953).
Galusha, H. H., forester, Gaylord Container Corp., Bogalusa, La.; Univ. of Mich., MF 1953 (Junior 1953).
Hudick, J. F., project forester, USFS, Ashland, Miss.; Pa. State, BSF 1955 (Junior 1955).
Wells, J. H., project forester, USFS, Batesville, Miss.; W. Va. Univ., BSF 1955 (Junior 1955).

Affiliate Grade

Howell, H. D., mgmt. forester, Miss. Forestry Comm., Tupelo, Miss.
Hunter, J. D., unit forester, International Paper Co., Carthage, Miss.
Lester, J. L., forester, USFS, Raleigh, Miss.

Inland Empire Section

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UNIVERSITY OF IDAHO

Harrison, D. L. Johnson, R. S.

Intermountain Section

Student Grade

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Bailey, S. J. McCleese, W. L.
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Ellison, R. A. Trowbridge, J. E.
Goon, J. T. Quinn, J. T.
Howard, D. M. Veater, J. C.

Member Grade

Almas, D. P., dist. forester, State of Idaho Dept. of Forestry, Boise, Idaho; Univ. of Idaho, BSF 1955 (Junior 1955).
Weissert, R. H., staff asst., Targhee Natl. Forest, St. Anthony, Idaho (Junior 1952).
Whitman, L. W., forester, McCall, Idaho (Junior 1952).

Affiliate Grade

Knotwell, J. S., forestry aid, USFS, St. Anthony, Idaho.

New England Section

Student Grade

UNIVERSITY OF MASSACHUSETTS

Nacon, M. W.

YALE UNIVERSITY

Barnett, C. F. Huberth, P. M.
Bricken, C. A. Lantz, C. W.
Watkins, F. G.

Junior Grade

Klein, W. H., graduate student, Yale School of Forestry, New Haven, Conn.; Ore. State, BSF 1958.
Sahlman, B. C., student, Yale School of Forestry, New Haven, Conn.; Univ. of Fla., BSF 1954.
White, E. C., student, Yale School of Forestry, New Haven, Conn.; W. Va. Univ., BSF 1954. (Reinstatement).

Affiliate Grade

Woodbury, R. J., research asst., Forestry Dept., Durham, N. H.

New York Section

Student Grade

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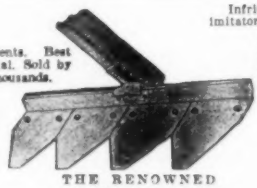
Clarke, R. L. Sharpe, D. M.

Member Grade

Stiell, W. M., research forester, Forest Research Div., Ottawa, Ontario, Canada; Univ. of B. C., BSF 1949, State Univ. of N. Y., MS 1955 (Junior 1955).



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Williams, J. R. M., forester, Ontario Dept. Lands & Forests, Queens Park, Toronto, Ont., Canada.

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Austin, K. A.	Bicho, J. G.
Barrette, B. R.	Collins, D. R.
Bentley, W. R.	Cook, S. R.
	Leonard, R. L.

Member Grade

Atkinson, W. A., forester, Soper-Wheeler Co., Strawberry Valley, Calif.; Univ. of Calif., BSF 1955, MS 1956 (Junior 1955).

Groneki, A. R., asst. dist. ranger, Natl. Door Mfg. Assoc., Bishop, Calif.; Univ. of Mich., MF 1951 (Junior 1951).

Olson, N. L., asst. forester, Union Lumber Co., Fort Bragg, Calif.; Univ. of Wash., BSF 1950 (Junior 1951).

Peterson, H. A., tech. forester, Simpson Redwood Co., Korbel, Calif.; Ore. State, BSF 1954 (Junior 1955).

Affiliate Grade

Brownlee, W. H., assoc. state forest ranger, Calif. Div. of Forestry, Nevada City, Calif.

Northern Rocky Mountain Section

Student Grade

Hoffman, J. O.	Poncin, D. E.
Joyce, A. T.	Ruff, P. H.
McGrath, W. T.	Troedsson, N. A.
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	Whitesitt, D. D.

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LEE, O. M.

Member Grade

Dollan, J. M., forester, USFS, Lolo, Mont.; Mont. State, BSF 1954 (Junior 1954).

Griffes, R. B., chief inventory forester, Office of the State Forester, Mont. State, BSF 1952 (Junior 1955).

Milodragovich, J. R., forester, Div. of State & Private Forestry, Missoula, Mont.; Mont. State, BSF 1941 (Junior 1954).

Ozark Section

Junior Grade

Bell, R. E., dist. forester, Fordyce Lumber Co., Fordyce, Ark. (Affiliate 1954).

Member Grade

Freeman, J. E., block forester, Olin Mathieson Chemical Corp., Huttig, Ark., LPI 1949 (Junior 1954).

Jensen, J. C., forester, Bur. of Land Mgmt., Russellville, Ark.; Iowa State, BSF 1949 (Junior 1954).

Nash, A. J., asst. prof. of forestry, Univ. of Mo., Columbia, Mo.; Univ. of B.C., BSF 1946, State Univ. of N. Y., MF 1952 (Junior 1955).

Wheeler, D. H., dist. forester, Dierks Dist., Dierks, Ark., Mont. State, BSF 1950 (Junior 1955).

Affiliate Grade

Oates, D. G., forester, USFS, Van Buren, Ark.

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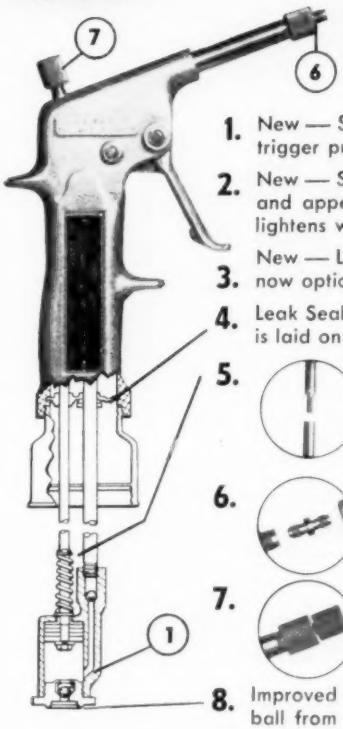

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Bourgault, P. A. — MacDonald, D. J.
Hulse, R. S. — Smith, B. O.

Junior Grade

Wise, E. E., forester, St. Regis Paper Co., Tacoma, Wash. (Reinstatement).

Member Grade

Carbaugh, P. M., forester, Olympic Natl. Forest, USFS, Port Angeles, Wash., (Junior 1952).

Collen, D. A., timber mgmt. forester, Dept. of Natural Resources, Sedro Woolley, Wash., Iowa State, BSF 1955 (Junior 1955).

Johnson, F. H., forester, USFS, Port Angeles, Wash. (Junior 1952).

Korosi, J. J., property assessment advisor, Wash. State Tax Comm., Olympia, Wash. (Junior 1952).

Lawson, W. L., area forester, West Tacoma Newsprint Co., Cosmopolis, Wash. (Junior 1952).

Sacheck, W. A., dist. administrator, State Dept. of Natl. Resources, Centralia, Wash. (Junior 1952).

Smith, E. E., dist. logging eng., USFS, Quilcene, Wash., Univ. of Wash., BSF 1955 (Junior 1955).

Zandersons, O. G., forester, USFS, Quinault, Wash.; Univ. of Mich., BSF 1954 (Junior 1954).

Zeller, R. E., forester, Rayonier Inc., Hoquiam, Wash. (Junior 1952).

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Boyd, W. H. — Price, R. F.
Broughton, B. C. — Rigsby, J. E.
Clements, M. L. — Shelton, D. L.
Ezell, R. C. — Sims, J. W.
Hunt, W. C. — Turner, A. B.
Kirby, A. H. — Warr, W. W.
Woodyard, G. G.

UNIVERSITY OF FLORIDA

Dancy, B. G. — Williams, G. T.

UNIVERSITY OF GEORGIA

Beasley, J. R. — MacDonald, R. B.
Brackin, T. C. — Melton, T. K.
Maxwell, J. W. — Ramsey, J. E.

Junior Grade

Dickinson, J. S., asst. dist. forester, Ga. Forestry Comm., Milledgeville, Ga.; Univ. of Ga., BSF 1950.

Member Grade

Bamping, J. H., instructor of forestry, George Foster School of Forestry, Athens, Ga.; Purdue, BSF 1952, MSF 1956 (Junior 1952).

Collins, J. H., project forester, Ala. Power Co., Dadeville, Ala.; API, BSF 1949 (Junior 1955).

Davis, B. M., area forest supt., International Paper Co., Monroeville, Ala.; API, BSF 1943 (Junior 1955).

Emery, R. B., dist. forest ranger, Bankhead Natl. Forest, Haleyville, Ala. (Reinstatement).

Flowers, E. D., forester, Union Bag-Camp Paper Corp., Savannah, Ga.; N. C. State, BSF 1955 (Junior 1955).

Looney, J. F., county forest ranger, McDuffie-Warren Forestry Unit, Thompson, Ga.; W. Va. Univ., BSF 1951 (Junior 1951).

Stone, W. N., forester, Gair Woodlands Corp., Savannah, Ga.; Univ. of Ga., BSF 1949 (Junior 1955).

Affiliate Grade

Bowen, J. E., dist. ranger, Ga. Forestry Comm., Americus, Ga.

Associate Grade

Brady, J. H., partner, Joe H. Brady & Assoc., Birmingham, Ala.

Upper Mississippi Valley Section

Student Grade

IOWA STATE COLLEGE

Berger, J. M. — Jayne, J. L.
Joens, R. L.

UNIVERSITY OF MINNESOTA

Aaberg, R. J. — Johnson, H. J.
Berg, R. O. — Koenigs, D. R.
Bohn, G. R. — Koepp, F. W.
Clausen, P. J. — Raske, A. G.
Erickson, C. J. — Schracht, A. J.
Huff, R. M. — Sievers, R. G.
Trochill, R. C.

Junior Grade

Close, G. E., dist. ranger, USFS, Northome, Minn.; Univ. of Minn., BSF 1950.

Wisconsin-Michigan Section

Student Grade

MICHIGAN STATE UNIVERSITY

Benson, D. A. — Hendee, J. C.
Briney, M. K. — Horning, P. A.
Carroll, A. J. — Humphrey, E. G.
Duryea, R. A. — Keith, V. D.
Ekstrom, L. K. — Nigl, R. M.
Fowler, F. C. — Peterson, W. B.
Fralish, J. S. — Rochester, P. G.
Hanson, C. A. — Sibbald, J. H.
Healey, S. L. — Suter, J. G.
Hearl, M. F. — Van Eynde, D. F.
Ward, D. J.

UNIVERSITY OF MICHIGAN

Bauer, R. G. — Fatzinger, C. W.
Eberhart, J. E. — Oliver, W. W.
Smith, C. T.

Member Grade

Barnes, B. V., jr. forester, USFS, Ann Arbor, Mich.; Univ. of Mich., BSF 1953 (Junior 1952).

Scherick, J. L., area forester, Marathon Corp., Lakewood, Wis.; Univ. of Minn., BSF 1955 (Junior 1955).

No Section

Junior Grade

Toland, J. J., Damage Control Officer, U. S. Navy, F.P.O., San Francisco, Calif.

Corresponding Grade

Hambanonda, Pit, forester, Thai Gov't., Bangkok, Thailand; Univ. of the Philippines, BSF 1941.

Notosoekotjo, R., chief, foreign relations, Ministry of Agric., Djakarta, Indonesia; Diploma, Forestry Academy, Indonesia.

Kwang Yao Tai, forester, Natl. Taiwan Univ., Taipei, Taiwan, Republic of China; Natl. Central Univ., BSF 1946.

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Forestry News

Paul Zehngraff Honored for Taiwan Work

Paul Zehngraff, forester for ICA in Taiwan (Formosa) from 1951 to 1957 and now serving in the Philippines, has been signally honored by the Taiwan Forest Administration, which recently dedicated a stone monument in recognition of his work on that island. Located along the Ylan roadside in northern Taiwan, overlooking the Philippine Sea, the stone has been carved with an inscription in both Chinese and English which says:

"This monument is placed in recognition of the work of Mr. Paul Zehngraff, Chief of the Foresty Division of the Chinese-American Joint Commission on Rural Reconstruction. Mr. Zehngraff, a sincere and enthusiastic forester from the United States of America, rendered outstanding service to Free China during the years of 1951-1957.

"Through his tireless efforts, a keen public interest was created in tree planting, and a Forest Resources and Land Use Survey was completed. Under his guidance and direction, a sound forest policy for Taiwan was formulated to further enhance the welfare and prosperity of the Chinese people. October 1957. Y. T. Tao, Director, Taiwan Forest Administration."

In addition to this stone in the Oriental tradition, other honors to Zehngraff have included the dedication to him both of a grove of southern U. S. pines and of a nursery. The nursery, designed as part of a program to accelerate reforestation in central Taiwan, occupies a terraced mountainside in the Experimental Forest of the National Taiwan University, and is named the Zehngraff Nursery. The grove, located outside the city of Taipei, was dedicated by the officials and people of Taipei together with those of the China Reforestation Association. It is marked with both a Chinese-inscribed stone post and a signboard stating, in English, "Forest in appreciation of Mr. Paul Zehngraff's service. Planted in March 1954. Shiao-kuo-tou. Taipei Hsien, Taiwan, China."

PAUL ZEHNGRAFF, *right*, is shown with the stone monument erected by the Taiwan Forest Administration in recognition of his work on that island. On the left is Taipei District Forester Pan Nai Keng.

Sweden Honors R. E. Marsh

Raymond E. Marsh, Fellow of the Society of American Foresters and assistant chief emeritus of the U. S. Forest Service, has been made an Officer of the Swedish Royal Order of Vasa, both as a recognition of his services in making Swedish forestry better known in the United States and as a symbol of friendship. Swedish Ambassador Gunnar Jarring presented the decoration of the order to Mr. Marsh on September 10, 1958.

The Order of Vasa, created in 1772 by King Gustavus III to honor the great Vasa Dynasty which is considered to have founded modern Sweden,

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EXTERIOR VIEW of the new Pulp and Paper Research Institute of Canada Laboratory in Pointe Claire, Quebec, near Montreal. The institute, which was formally opened on Sept. 18, represents a three way partnership between the federal government, McGill University, and the Canadian pulp and paper industry.

is an order of merit given chiefly in recognition of achievements in business, medicine, engineering, and industry. So far as is known, it has never before been awarded to an American forester.

Long-time student of public forest policy and national programs, Mr. Marsh went to Scandinavia as a Forest Service collaborator after his retirement, and spent several months in field observation, consultation with local authorities of all kinds, and intensive study of written material in order to gain a firm understanding of public forest policy and its workings in the Scandinavian countries. Prior to embarking on the project, he undertook to study the Swedish language. In 1955 he made a second trip to Sweden and Finland to deepen his understanding of the subject.

A report of his findings, published by the Charles Lathrop Pack Forestry Foundation in 1954 under the title *Public Policy Toward Private Forest Lands in Sweden, Norway, and Finland* was very favorably reviewed in the world's leading forestry periodicals, and consideration is now being given to translating the report into two foreign languages.

Besides his study of Swedish public forest policy, Mr. Marsh has written over 16 books and papers dealing with forest resources and their management.

At present he is a member of the executive committee of the Citizens' Committee on Natural Resources, and is president of the Fossils, an organization composed of retired scientists, professional and businessmen from both public and private life. He is also a member or chairman of other committees, and is president of the FSX Club of Washington, an organization composed of men retired from the U. S. Forest Service.

Kellogg Park Dedicated in Florida

State Forester C. H. Coulter on November 15 formally dedicated a 3-acre park east of Oneco, Fla., as the "Kellogg Park" in honor of Royal S. Kellogg. Widely known throughout the forestry profession, Mr. Kellogg was cited for his efforts and achievements in forestry, particularly those in the South in the 1920's "that made improved forest utilization and protection a major objective of the pulp and paper industry."

On state land at a forest fire control headquarters, work on the park has been carried on since 1955 as a spare time activity of fire control personnel with materials and plants and shrubs donated by individuals and companies.

Mr. Kellogg was present to witness the dedication with materials and plants and shrubs donated by individuals and companies.

Conservation Reserve Sign-Up Exceeds Goal

Figures released by the U. S. Department of Agriculture show that farmers have filed applications for 1959 contracts in the Conservation Reserve of the Soil Bank far in excess of the goal. For the nation as a whole, farmers offered more than 20 million acres and the goal had been 12.5 mil-

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lion acres. Only 10 million acres of cropland had been placed in the Conservation Reserve program in 1956. 1957, and 1958. If all applications were approved for contracts by County ASC committees, first-year practice and annual payments would require more than the $285 million available for 1959 in new contracts. The department indicates it will therefore be necessary to follow the announced priority system in most states.

National Forest Receipts Hit Billion Dollar Mark

The Department of Agriculture reports that the billionth dollar in national forest receipts was deposited in the Federal Treasury in Washington, D. C., on November 21, 1958. This total includes gross income from national forest land since 1905, the year in which the U. S. Forest Service was established.

The Forest Service points out that although it has taken 53 years for the receipts to reach $1 billion, in the early years the income from the lands was very small. In recent years the demand for all national forest resources, including timber, the main cash crop, has risen and the income has increased considerably. For example, the 1957 receipts exceeded operating expenses by $32,292,000. Based on current receipts—$111,589,000 in fiscal year 1957—the Service has estimated that the second $1 billion dollars will be reached within the next 10 years.

During the past 50 years about $2.5 billion dollars was spent protecting, acquiring, and improving national forest land. But, the Forest Service points out, the first $1 billion should be regarded as only a part of the dividend on an investment; the capital assets are still there, and other values credited to the 181 million acres of national forest lands are "stable soil, water, spiritual and esthetic values, outdoor recreation, and wildlife."

Alabama Issues 211 Licenses to Foresters

A total of 211 licenses was issued to foresters by the Alabama State Board of Registration for Foresters during the first year of operation ending September 30, 1958, according to W. B. DeVall, chairman of the Board and head, Forestry Department, API Agricultural Experiment Station.

Foresters from six states were included in this number and 180 were from Alabama. These licenses were issued in accordance with regulations of Alabama Law, Act 533, passed by the State Legislature in 1957.

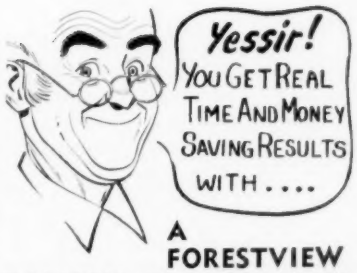
Also reported at the regular meeting of the Board in Montgomery during November were activities of a recent joint meeting with the Georgia Board of Registration. Status of registration in these two states was discussed. The Board adopted rules and reviewed pending applications.

New headquarters for the Board is 726 Administrative Building, Montgomery, Ala.

Sixth Watershed Congress Slated for Washington

Sponsors of the National Watershed Congress have chosen Washington, D. C., as the site of their sixth annual meeting. It will be held May 25-27 in the Statler Hotel. The last meeting was held in Dallas, Texas, in September 1958.

More than 20 major agricultural, business, civic, and conservation organizations sponsor the yearly meetings, dedicated to fostering public understanding and participation in a national program to control water runoff and soil erosion in upstream areas



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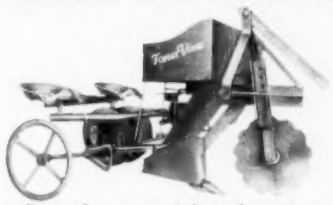

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where more than one-half of the annual flood damage occurs.

C. R. Gutermuth, vice president of the Wildlife Management Institute, was designated by the sponsors to succeed the late Waters S. Davis, Jr., treasurer and former president of the National Association of Soil Conservation Districts, as chairman of the congress steering committee. Other members of the committee include Charles C. Butler, American Farm Bureau Federation; John H. Jones, American Watershed Council; and James B. Craig, American Forestry Association.

The congress will be open to all interested persons. The program will feature a review of progress in watershed development and factors that will influence the program in the years to come.

Northeasterners Discuss Better Utilization of Beech

About 75 loggers, lumbermen, wood processors, and research workers from the Northeast gathered at the Pavilion Hotel, Montpelier, Vt., November 6 and 7 for a conference of "Better Utilization of Northeastern Beech."

C. A. RISHELL

The conference was co-sponsored by the Utilization Division of the Northeastern Loggers' Association and the Vermont Bureau of Industrial Research. It was the culmination of an intensive 12-year research project by the Northeastern Technical Committee on Utilization of Beech, comprised of representatives of several federal and state research agencies and forest industries in the Northeast. During this period the committee has prepared 17 papers on various aspects of the beech utilization "problem" which have been published and distributed by the Northeastern Forest Experiment Station. Four additional papers, now in process of publication, will complete the series. The conference consisted of a summary and up-dating of the contents of these papers, and a discussion of current progress and desirable future action in the beech utilization field.

Private & Industrial

C. A. Rishell Retires from TECO

Carl A. Rishell, vice president, Timber Engineering Company, Washington, D. C., research affiliate of the National Lumber Manufacturers Association, announced his retirement December 31, 1958, after 24 years' service with both organizations.

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Mr. Rishell first joined the NLMA in 1934. In 1936 he became chief of the Hardwood Division. In 1943 he assisted in the establishment of the TECO wood products research laboratory, and served as director of research for both TECO and NLMA until his election to a vice presidency in 1955.

A native of Emporium, Pa., he was graduated from Pennsylvania State College, School of Forestry, in 1923, interrupting his schooling to serve in the U. S. Navy during World War I. His Alma Mater awarded him a Forestry Achievement Award in 1957 for outstanding service to his profession.

Following graduation he joined the W. M. Ritter Lumber Company, holding various technical and administrative posts. He served with the Lumber Code Authority, and the Forest Products Division of NRA.

Widely experienced in wood product development and improvement, and particularly in marine products and wood utilization processes and economics, Rishell is recognized as an authority on wood particle board development and manufacturing techniques. He has headed surveys of particle board production and utilization methods being used in European countries.

E. F. HEACOX

Mr. Rishell is one of the original directors of the Forest Products Research Society; a Fellow in the American Institute of Chemists; a member of the Forest Products Advisory Committee of the National Security Industrial Association and of the Society of American Foresters.

After his retirement he will undertake consultation work on specific wood research projects or problems for a small group of clients, including the Timber Engineering Company.

Heacox Assumes New Weyerhaeuser Duties

Retirement of C. D. Weyerhaeuser as vice president in charge of the Forestry, Lands and Timber Department was recently announced by F. K. Weyerhaeuser, president, Weyerhaeuser Timber Company.

Retirement was requested after 25 years of service to allow him to devote more time to other activities. He continues as a director of the company.

Edwin F. Heacox, managing forester, will become manager of the department. His appointment and the retirement of C. D. Weyerhaeuser are effective as of January 1, 1959.

Heacox has been with the company since March 1930. Before transfer to Tacoma, Wash., in 1948 as managing forester, he was branch forester for the company at Longview, Wash. In his new capacity he will report to George H. Weyerhaeuser, vice president, Wood Products Group.

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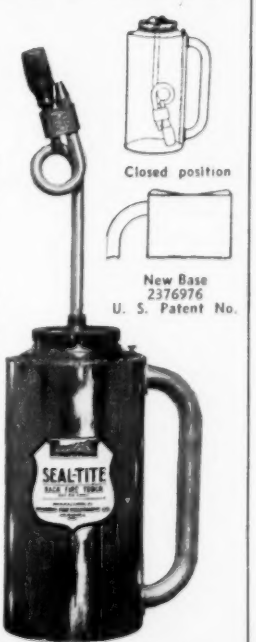

ARTHUR W. HOLMES

Georgia-Pacific Announces Holmes Promotion

Georgia-Pacific Corp. has announced appointment of Arthur W. Holmes as log and timber buyer for its Coos Bay division. The promotion moved Holmes from the corporation's Portland office, where he was administrative assistant in the timber division, to Coquille, Ore.

Holmes, who joined G-P in 1956, has 11 years' experience as a forester and log buyer in Oregon.

He is a graduate of University of California.

Holmes did post-graduate study at Oregon State College. Prior to joining G-P, he served as forester for the Prospect Timber Corp., and forester-log buyer for Columbia-Hudson Lumber Co.

Robert H. Rushing to Manage Sales for Pope & Talbot

Appointment of Robert H. Rushing as general sales manager for all Pope & Talbot lumber products divisions has been announced by Hillman Lueddemann, Pope & Talbot vice president and general manager.

Rushing replaces Saxton B. Ferrell who resigned October 1.

Rushing is a forestry graduate of Oregon State College. For the past ten years he has been sales manager for the Giustina Bros. Lumber Co. in Eugene, Ore. Earlier experience included a year as sales manager for the C. D. Johnson Lumber Corp., Portland, and one and a half years each as lumber buyer with the Sterling Lumber Co., Philadelphia, Pa., and as lumber inspector for the Southern Pacific Railroad.

ROBERT H. RUSHING

SPCA Starts New Demonstration Program

An intensive forest development program for small woodlands is to be launched in 12 southern states by the Southern Pulpwood Conservation Association, Atlanta, Ga.

H. J. Malsberger, general manager of the association, said that a "Pilot Forest" project, to be formally launched on the second annual Southwide Pulp and Paper Day, April 14, 1959 calls for "putting selected farm or other individual forest tracts throughout the South on the way to peak production." The new educational program is designed to provide permanent examples to show the way

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to increasing farm income for timberland owners.

The initial goal of the program is to establish Pilot Forests in some 100 counties throughout the South. Pulp and paper companies have agreed to do a complete forestry job on these selected woodlots. This will include planting, controlling weed trees, harvesting scientifically, establishing fire control measures, and other required practices. All of the work will be performed without charge to the owner of the property picked for the campaign who will receive all of the proceeds from timber harvests.

Woodlands selected for the mass rejuvenation program are to be typical of the area in which they are located and are to be easily accessible. Local agricultural and forestry agencies will be asked to cooperate in selecting the areas to be used.

Industry foresters assigned to the "Pilot Forest" projects will also make an analysis of the forest economy of the counties in which the demonstration forests are located. Results of the county surveys will be made available to businessmen and others interested in community development opportunities.

Officers, Trustees of AFPI Re-Elected

John B. Veach of Asheville, N. C., president of the Hardwood Corporation of America, was re-elected president of American Forest Products Industries, Inc., at the association's annual meeting November 7, in Washington, D. C.

J. D. Bronson, Cascade Lumber Co., Yakima, Wash., and John H. Hinman, International Paper Co., New York, were re-elected vice-presidents. D. B. Frampton, D. B. Frampton & Co., Columbus, Ohio, was re-elected treasurer. Charles A. Gillett was re-elected secretary.

Simpson Research Director Killed in Accident

Arthur T. Walton, director of research for the Simpson Logging Company, Shelton, Wash., was killed in an automobile accident on November 17, 1958 near Castle Rock, Wash. He was 41 years old.

Mr. Walton had gained a national reputation in the field of wood utilization. A 1940 graduate of the University of Washington, he worked in the original planning and design of Simpson's insulating board plant, erected in 1947, and was associated with that operation in research and management capacities until his death.

NLMA Elects Officers

Robert M. Ingram, president and general manager of the E. C. Miller Cedar Lumber Co., Aberdeen, Wash., was elected president of the National Lumber Manufacturers Association November 13 at the 1958 annual meeting of NLMA directors and committees in Washington, D. C.

Ingram succeeds N. Floyd McGowin, president of the W. T. Smith Lumber Co., Chapman, Ala. McGowin was elected NLMA board chairman succeeding Walter Leuthold, Deer Park, Wash., lumberman, who becomes chairman of NLMA's Policy Committee.

Thomas J. McHugh, president of the Atlantic Lumber Co., Boston, was elected first vice president of NLMA.

Elected regional vice president of the association were:

A. B. Hood, president of the Western Pine Association, Portland, Ore., and vice president and general manager of the Ralph L. Smith Lumber Co., Anderson, Calif.

Jack Fairhurst, president of the West Coast Lumbermen's Association, Portland, Ore., and vice president and general manager of the Fairhurst Lumber Co., San Rafael, Calif.

M. W. Smith, Jr., president of the Southern Pine Association, New Orleans, and the M. W. Smith Lumber Co., Jackson, Ala.

Edwin L. Douglass, president of Southern Hardwood Producers, Inc., Memphis, Tenn., and the Augusta Hardwood Co., Augusta, Ga.

Ingram is immediate past president of the West Coast Lumbermen's Association, a captain in the Naval Reserve, and a former president and continuing member of the Port of Grays Harbor Commission.

U. S. Plywood Scholarship to H. R. Bryant

H. R. Bryant of Eugene, Ore., a forest engineer for the U. S. Forest Service, was selected to receive a $1,000 fellowship for advanced study in forestry at Oregon State College during 1958-1959.

The fellowship is sponsored by the United States Plywood Corporation.

Bryant, a 1949 graduate of Oregon State, has worked on the Rogue River

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At OSC, he is investigating the relation of landforms to forest road location.

This is the third year the award has been given by United States Plywood Corporation.

McKnight to Head KMG Finance Program

Long-range planning and financing for Keep Minnesota Green, Inc., will be directed by Henry T. McKnight, according to a recent announcement by Dr. Frank H. Kaufert, president of KMG.

McKnight, who has been associated with several forestry and agriculture conservation groups on both the state and national level, is manager of Zumbra farm at Victoria; vice president of S. T. McKnight Company of Minneapolis; a director of Weyerhaeuser Timber Company, Tacoma, Wash., and a director of the American Forestry Association.

As chairman of the KMG committee, McKnight succeeds Bernard L. Orell, who recently moved from St. Paul to Tacoma, Wash.

Public

Advisory Group Emphasizes Need for Study of Epidemic Forest Diseases

Research on epidemic diseases and insect infestations of forest trees that are potentially capable of lowering or destroying forest productivity was advised by the U. S. Department of Agriculture's Forest Research Advisory Committee at this year's annual meeting.

The committee met Oct. 13-18 at Asheville, N. C., and Valdosta, Ga.

In regard to the research on forest tree diseases and insects, the committee observed that thorough knowledge of causes and behavior patterns of insect and disease outbreaks is essential to effective control, and specified the need for studies of sugar maple blight, oak wilt, Hypoxylon canker (of aspens), Douglas-fir beetle, and spruce budworm.

The committee also advised that there is a need for research on the types and quantity of forest recrea-

tional facilities needed now and in the future. Standards are also needed, according to committee members, for selecting and managing these areas to prevent deterioration of vegetation and soils, and to make recreational uses of forests compatible with other uses, such as timber, water production, forage, and wildlife.

Other research proposals which the committee felt merited high priority dealt with timber management, range management and wildlife habitat, watershed management, forest protection, forest economics and marketing, and forest products utilization research.

Virginia Personnel on Scholarship Leave

The Virginia Division of Forestry has this year $9,000 with which to send three of its personnel to selected colleges to bring themselves and the organization up-to-date on subjects of particular interest to the division. This money is generously made available to the Division of Forestry by the Old Dominion Foundation, which is financed by the Paul Mellon family. This is the third year a grant of this type has been available. During the year 1958-1959, the three men on scholarship are: Thomas A. Dierauf, assistant district forester in charge of forest management, Tappahannock district, is at North Carolina State College studying, in general, the effects of soil structure and moisture conditions as they affect the site for the eastern Virginia pines; James C. Hinkle, Jr., assistant district forester, Salem district, in charge of forest management, is at the University of West Virginia studying the silviculture and management of mountain hardwoods; Caleb L. Morris, chief of the division's Insect and Disease Branch, is at the New York State College of Forestry perusing the latest material on forest insects and diseases.

Church Joins Lake States Staff

Thomas W. Church has been appointed to the technical staff of the Marquette, Mich., field unit of the Lake States Forest Experiment Station, according to Station Director M. B. Dickerman. Church will head up the research in the management of northern hardwoods. He has been a forester for the past three years for Whitney Industries at Sabattis, N. Y., and prior to that, spent six years with the Northeastern Forest Experiment Station.

Church obtained a bachelor's degree in forestry at Penn State and a master's from Duke University.

Felix Czabator Promoted

Felix Czabator was recently appointed plant pathologist in the Division of Forest Disease Research at the Southern Forest Experiment Station, New Orleans, La.

Dr. Czabator joined the staff of the Southern Station in 1956 as silvicultural forester in the Division of Forest Management Research. He holds a doctor's degree from the State University College of Forestry at Syracuse. He has worked in many phases of forestry in the South, and was forester in charge of the State Nursery at Autaugaville, Ala., when it was organized.

In his new assignment, Dr. Czabator will work closely with state forestry agencies of Alabama, Louisiana, Mississippi, and Texas in a cooperative plan to increase the production of nursery seedlings.

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THOMAS F. MCLINTOCK

McLintock, Wenger Moves Announced

Richard E. McArdle, chief of the Forest Service, has announced the assignment of Thomas F. McLintock to the staff of the assistant chief for research in the Washington Office of the Forest Service.

Dr. McLintock goes to Washington from Lake City, Fla., where he has been directing a program of research on forest management, tree genetics, naval stores production, and forest grazing. Prior to his Lake City assignment he conducted programs of forestry research at Bangor, Maine, and in the Midwest. Other assignments include the Timber Production War Project and studies on the silvicultural control of the devastating spruce budworm in the Northeast and Canada.

Dr. McLintock was graduated from Iowa State University in 1938 with a B.S. degree in forestry, and received his M.S. degree there in 1939. In 1957 Yale University awarded him the Ph.D. degree.

Karl F. Wenger, assistant chief in the Division of Forest Management Research of the Southeastern Forest Experiment Station, Asheville, N. C., has been named to succeed Dr. McLintock as center leader of the Lake City Research Center.

After getting a B.S. in forestry from the University of Maine, Dr. Wenger began work for the Forest Service in 1940, and in 1946, following four years with the Air Force, was assigned to the station's center at Charleston, S. C.

Dr. Wenger received a Ph.D. in 1951 from Duke University. For five years thereafter, he was stationed at Franklin, Va., conducting field studies in thinning, seed production and dispersal, and growth and development of seedlings. Since 1956 he has been stationed at the Asheville office.

KARL F. WENGER

Schools

Southern Forestry Symposium at LSU

"Southern Forest Soils" will be the subject of the eighth annual Louisiana State University Forestry Symposium to be held April 9-10, 1959, on the university campus in Baton Rouge, according to Dr. Paul Y. Burns, director of the LSU School of Forestry, who will serve as general chairman. About 400 foresters from the southern states are expected to attend.

About 12 speakers, each a specialist in his subject area, will participate in the symposium, according to Dr. Burns.

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328 Brentwood Lane, Mobile, Ala.

Topics to be discussed will include fertilization, soil-moisture relationships, tree nutrition, and the relationship of site factors to forest land productivity.

Visiting foresters will be housed in Pleasant Hall, the university's guest dormitory. The symposium will be held in the auditorium of the Music and Dramatic Arts Building.

For additional information, write Dr. Paul Y. Burns, Director, LSU School of Forestry, Baton Rouge 3, La.

Behre Visiting Professor at SIU

C. Edward Behre has been named a visiting professor of forestry at Southern Illinois University, Carbondale.

He will teach logging and milling and farm forestry during the winter term and be on the SIU forestry camp staff during the spring term.

Behre retired in 1955 after 32 years with the U. S. Forest Service. He conducted forest management research and was the director of the Northeastern Forest Experiment Station until 1942, when he went to the Forest Service headquarters in Washington, D. C., to work on forest economic analysis, forestry policy, and legislation. Before joining the Forest Service staff in 1923 he was associate professor at the University of Idaho for four years. He is a graduate of the Yale School of Forestry.

Appointment of Behre gives the SIU Forestry Department three full-time and three part-time faculty members. Fifty-seven students are majoring in SIU's four-year forestry degree program.

Chemist to Teach Wood Technology at North Carolina

Alfred J. Stamm, chemist with the U. S. Forest Products Laboratory, has been named research associate professor of wood technology in the School of Forestry at North Carolina State College.

His appointment to the new position will be effective July 1, 1959.

A native of Los Angeles, Calif., he received his bachelor of science degree in chemistry from the California Institute of Technology in 1921 and his master's and doctor's degrees from the University of Wisconsin in 1923 and 1925.

After serving as a chemist with the General Petroleum Corporation during 1921 and 1922, Stamm became affiliated with the U. S. Forest Products Laboratory as associate chemist.

Forestry Centennial Conference Planned at OSC

A special centennial conference on "The Second Century of Forestry in Oregon" has been scheduled for February 20-21 at Oregon State College with forestry leaders from throughout the nation participating in the predictions of what's ahead for the forest industry.

The two-day conference will be one of the major state events marking the opening of the 1959 Oregon Centennial observance.

The annual Fernhopper Banquet, traditional forestry alumni event at OSC, will be held February 21 as a part of the centennial conference program.

Utah State Student Honored for Aerial Fire Fighting Studies

For his contributions to the study of forest fire fighting by helicopter, James L. Murphy, a graduate student at Utah State University, has been given a $200 cash merit award by the U. S. Forest Service.

In 1956 Murphy received a $2,800 research grant from the California Forest and Range Experiment Station of the Forest Service and was assigned to the "Helitack" aerial fire fighting project, jointly sponsored by the experiment station, the Army Corps of Engineers, and the California Division of Forestry. Much of the work on "Helitack" was done at Utah State University as a result of the student aid program.

Murphy's work in the program included planning, organizing, and conducting test procedures. He was partially responsible for developing the Helitack crewman's jump suit, and has conducted training sessions for nearly 400 personnel in California. During the summer he conducted a 5-day training school at McCall, Idaho.

Murphy expects to receive his MSF degree from Utah State in 1959. Afterward he will be employed by the Payette National Forest, Idaho. Before attending Utah State he worked for several years on the Angeles National Forest, California.

Georgia Short Course Announced

A short course in "Continuous Inventory Control in Forest Management" will be offered May 4-8 in the Center for Continuing Education, University of Georgia, Athens. Application blanks and further information may be obtained from the center.

Reforestation Arboriculture
S. GAYLEY ATKINSON
Consulting Forester
Huntingdon Road
Huntingdon Valley, Pa.

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JOHN G. GUTHRIE
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BOX 517 WIGGINS, MISS.
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Professional Forestry Services
Thomas F. Schweigert, Pres.
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822 North Water Street MILWAUKEE 2 BRoadway 6-2068
Consultants to the Wood Using Industries

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JOHN W. ANDRESEN

Andresen Joins Staff of Michigan State University

John W. Andresen has been appointed to the staff of the Forestry Department of Michigan State University, Ann Arbor, as instructor of forestry, teaching in the fields of dendrology and forest protection.

Dr. Andresen completed his undergraduate training in forestry at Syracuse in 1953 and received his Ph.D. in forest botany and ecology at Rutgers in 1958.

From 1953 until accepting this appointment with Michigan State University, Dr. Andresen has been an instructor at Rutgers University. He is also a technical consultant for the American Museum of Natural History.

Dr. Andresen served in the Mediterranean Theater during World War II and is a major in the Air Force Reserves.

Announcement of Summer Session in Statistics

The 1959 session of the Southern Regional Graduate Summer Session in Statistics will be held at North Carolina State College, Raleigh, from June 8 to July 17.

The 1959 session, like previous sessions under the Southern Regional Education Board program, is intended to serve research and professional workers who want intensive instruction in basic statistical concepts and modern statistical methodology as well as teachers, statisticians, and others.

Forestry Employment

Positions Available

Openings for Junior Foresters, in management and procurement with large sawmill operation in central Louisiana. Starting salary $400-$440 per month with opportunity for advancement. Prefer married man with southern forestry background. *Write full details of experience, education, and references.* **Norman Martin, c/o Roy O. Martin Lumber Co., Alexandria, La.**

NURSERYMAN WANTED:

Assistant nursery superintendent. Beginning salary $4500 per annum. Educational background required: degree in forestry, horticulture or agronomy. Nursery experience desirable, but not essential. Nursery located in southeast Texas. If qualified and interested write Director, Texas Forest Service, College Station, Texas.

Positions Wanted

Graduate Forester. B.S. Penn State 1954, M.F. Yale 1955. Age 26, single. U.S. Naval Aviator to be released in March 1959. Commercial pilot, single and multi engine land, instrument, Constellation type rating. 1400 hours. Desire forest management job with good future for those with initiative and ability. Willing to travel and use aviation experience.
Box O, Journal of Forestry, Mills Building, Washington 6, D. C.

January 1959 graduate with B.S. in Forestry and B.S. in Business Administration desires challenging job requiring both technical and business ability. Previous experience includes two years as navy line officer, three years of sale and business experience with nationally known paper corporation, and three summers forestry field experience. Opportunity and responsibility in a job requiring drive and initiative is desired.
Box P, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S., Forest Management, Montana State Uni. 1956. Age 25, single. Experience with Forest Service and Bureau of Land Management in timber cruising and marking methods. Recently completed Army service obligation. Desire position in Pacific Northwest with public agency or private industry.
Box Q, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S., 1956, Purdue Univ. Age 25, married, one child. Experience: 4 months southern forestry including C.F.I., cruising, and insect control plots. Two years in cost and industrial engineering department, formulating production standards, analyzing optimum production routing systems for manufacturing of finished product. Desire position in western forest research or management but will consider other fields.
Box S, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S. Forest Management. Univ. of Idaho 1940 Graduate work, Business Administration and Law. Age 40, married, 4 children. Reliable. Industrious. Experience: general ranger district work U.S.F.S., one year general land management for large Arkansas producer, five years military service, ten years marketing building materials, two years consulting engineering. Will relocate. Seeks interview near Detroit, Michigan.
Box T, Journal of Forestry, Mills Building, Washington 6, D. C.

Consulting Foresters

Approved for Listing on January 1, 1959, by the
SOCIETY OF AMERICAN FORESTERS

The following list of Consulting Foresters is published by the Society of American Foresters for the information of prospective clients.

Individuals listed are members of the Society of American Foresters and as such are believed qualified and competent to perform the technical services specified. However, the Society cannot assume responsibility for the actions of individuals or firms listed.

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*Member, Association of Consulting Foresters.

Code of Fields of Specialization

1. Arboriculture and tree preservation.
2. Cost and economic studies of forest operations.
3. Forest and wood utilization.
4. Forest management and silvicultural practice.
5. Forest protection from disease.
6. Forest protection from fire.
7. Forest protection from insects.
8. Forest taxation.
9. Game and wildlife management.
10. Logging engineering.
11. Market studies and trade promotion (forest products).
12. Naval stores operations.
13. Pulpwood operations.
14. Range management.
15. Surveying and mapping.
16. Timber valuation and appraisal.
17. Timber volume and quality estimates.
18. Tree planting and reforestation; reproduction studies.
19. Wood preservation.
20. Wood seasoning.
21. Wood technology.

Adirondack Forestry, Inc., Wilmington, New York.
Forest Consultants: Donald E. Peterson, David E. Strong.
Territory: Northeastern U. S., esp. Adirondack Mountains.
Specialization: 3, 4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 19. Also aerial photo interpretation, timberland and brokerage service, and forest plantation management.

Ernest E. Ahler, Forest Consultant, Route 2, Bishop Road, Knoxville 18, Tennessee.
Territory: Southeast.
Specialization: 2, 3, 4, 6, 13, 16, 17, 18. Also preparation, negotiation or advertisement, and administration of timber sales for large and small timber landowners, boundary line establishment, contract sawmilling, and reforestation.

Airview Specialists Corp., 48 Thomas Lane, Pleasant Hill, California. Aerial surveys — mapping — forestry services.
Territory: United States, Alaska, Canada, Mexico.
Specialization: 4, 5, 7, 15, 16, 17, 18. Also complete aerial photography and mapping services. Color aerial photography for forest photo interpretation.

Thos. W. Alexander, Consulting Forester, Waynesville, North Carolina.
Territory: South, Central States, and Appalachians.
Specialization: 2, 4, 11, 16, 17.

I. V. Anderson, E. 13008 Maxwell, Spokane 67, Washington.
Territory: Eastern Washington and Oregon, Idaho, Montana, and other Rocky Mountain states to Mexico.
Specialization. 3, 4, 11, 16, 17, 18. Including special work on evaluation of ponderosa pine quality and procurement of specialty woods.

John R. T. Andrews, 1450 O'Connor Drive, Toronto 16, Canada. Hunting Technical and Exploration Services, Ltd.
Territory: World wide including tropical forestry.
Specialization: 2, 4, 8, 10, 11, 15, 16, 17, and 18. Also integrated resource surveys and mapping, using photogrammetric techniques.

Glenn O. Antonie, Consulting Forester, 411 South Walnut, Demopolis, Alabama.
Territory: Alabama, Mississippi.
Specialization: 2, 3, 4, 5, 6, 7, 8, 12, 13, 15, 16, 17, 18. Also agent for absentee timber owners; timber sales and cutting supervision; forest litigation.

S. Gayley Atkinson, Consulting Forester, Huntingdon Road, Huntingdon Valley, Pennsylvania.
Territory: Pennsylvania.
Specialization: 1, 18.

Atlantic States Forestry Company, Carthage, North Carolina.
Territory: Eastern and southern United States.
Specialization: 2, 3, 4, 8, 9, 15, 16, 17, 18. Also forest damage appraisals, litigation, timberland sales and purchases, aerial photo-controlled cruises, and reconnaissance from aircraft.

Arthur G. Axtell, Consulting Forester, 20 old Forge Road, Glens Falls, New York.
Territory: Northeast.
Specialization: 2, 3, 4, 8, 11, 13, 15, 16, 17, 18. Also timber purchases and sales.

*Henry L. Bango, Consulting Forester, P. O. Box 4072, Shreveport, Louisiana.
Consultant: Frank Gaensehals.
Territory: Northern Louisiana, south Arkansas, east Texas.
Specialization: 3, 4, 5, 16, 17, 18. Also purchase and sale of timbered properties.

George Banzhaf & Company, 662 North Water St., Milwaukee 2, Wisconsin.
Territory: Not limited.
Specialization: 2, 3, 4, 11, 13, 15, 16, 17.

***W. R. Barnhill**, 1113 Gillespie Ave., Albany, Georgia.
Specialization: 4, 11, 12, 15, 17, 18. Also forest damage investigations, tree planting (contract).

Curtis H. Bauer, Consulting Forester, 54 Dearborn Street, Jamestown, New York.
Territory: Western New York and Pennsylvania.
Specialization: 2, 3, 4, 13, 16, 17, 18. In addition to serving the local lumber industry and woodland owners, services are designed for the Christmas tree industry.

Russell W. Beeson, Wildland Management Consultant, 17 Highland Boulevard, Berkeley 7, California. Telephone: Landscape 5-6906.
Territory: California and Arizona.
Specialization: 4, 6, 9, 14, 16, 17, 18. Also range, watershed and flood control surveys. Land exchanges involving Bureau of Land Management or Forest Service lands.

Belanger and Bourget, Land Surveyors and Forest Engineers, 86 Cote de la Montagne, Quebec, Canada.
Consultant: M. Albert Bourget.
Territory: Canada, especially Quebec.
Specialization: 2, 3, 4, 10, 11, 13, 15, 16, 17, 19, 20, 21. Also boundary lines.

Frank W. Bennett & Associates, Consulting Foresters, 4767 Convention St., Baton Rouge, Louisiana. (Field Hdqrs. at Norwood, La., and Alexandria, La.)
Consultants: Frank W. Bennett, Lewis C. Peters, James E. Moore,

and Kenneth W. Reviel, 2805 LaSalle Dr., Alexandria, La.
Territory: Southern United States.
Specialization: 3, 4, 6, 10, 11, 16, 17, 18. Retained as consultants by medium size landowners (500 to 50,000 acres). Manage all forest land resources, including timber, grazing, wildlife, minerals, etc. Make plant location surveys for large wood using plants (pulp mills).

Bigley and Feiss, Foresters, Inc., 767 Blair Blvd., Eugene, Oregon.
Consultants: Sherman Feiss, John Venator, Howard G. McDowell, and William F. Smith.
Territory: Washington, Oregon, California.

John C. Billingsley, Forest Consultant, 924 Fair Street, Newberry, South Carolina.
Consultant: C. Ashley Abel.
Territory: South Carolina and Georgia.
Specialization: 3, 4, 6, 9, 10, 15, 16, 17, 18.

Bishop Brothers, Consulting Foresters, Marion, South Carolina.
Consultants: H. F. Bishop, Marion, S. C.; R. Q. Bishop, Florence, S. C.
Territory: South Carolina and southeastern United States.
Specialization: 3, 4, 6, 8, 10, 13, 15, 16, 17, 18.

L. L. Bishop, Forest Consultant, 7034 Airline, Houston 9, Texas.
Territory: East Texas.
Specialization: 4, 6, 16, 18.

Lewis M. Boice, Consulting Forester, Orangeburg, South Carolina.
Territory: Within 100 miles of Orangeburg.
Specialization: 4, 5, 6, 7, 13, 16, 17, 18.

***William J. Bozett**, Consulting Forester, Logan, Ohio.
Territory: Unlimited.
Specialization: 2, 3, 4, 5, 6, 7, 10, 11, 13, 15, 16, 17, 18, 20. Forest management and marketing, land acquisition for investors, damage appraisals, Christmas tree management and tree planting, serving industry.

Allen W. Bratton, Consulting Forester, Shelterwood, Cooperstown, New York.
Territory: Northeast.
Specialization: 4, 5, 6, 7, 8, 11, 15, 16, 17, 18.

Brown and Brown, Forest Engineers, 614 Lewis Building, Portland 4, Oregon.
Consultants: Eugene R. Walsh (S.A.F. Associate Member), Samuel Rotschy.
Territory: Pacific coast.
Specialization: 2, 3, 4, 6, 8, 10, 11, 12, 15, 16, 17, 18.

Nelson C. Brown, Consulting Forester, 122 Dorset Road, Syracuse 10, New York. During summers, Milford, Pa.
Territory: Northeast.
Specialization: 2, 3, 8, 10, 11, 13, 16, 17.

Charles H. Bunting, Consulting Forester, 2455 Placer St., Redding, California.
Territory: Pacific Coast.
Specialization: 2, 10, 15, 16, 17.

Robert H. Cain, Consulting Forester, 1423 College Drive, Pineville, Louisiana.
Territory: Louisiana.
Specialization: 4, 6, 7, 13, 15, 16, 17, 18. Timberland agent, private and industrial.

Cal-Pacific, Forest Consultants, 3030 Pope Ave., Sacramento 21, California.
Consultants: James E. Greig, Harvey A. Striplin, Jr.
Specialization: Timber management, cruising, sales.

***N. D. Canterbury**, Consulting Forester, Parklane Apts. 310, 5701 Jackson St., Houston 4, Texas.
Territory: Texas and southeastern U. S.

Capital Forestry Co., Inc., 2967 Troy Road, Schenectady 9, New York.
Consultant: Ernest L. Handy, Forester and Landscape Architect.
Territory: New York, New England States, Pennsylvania, and New Jersey.
Specialization: Timber cruising, marking and marketing studies, arboriculture, landscape designing and planting, tax and insurance appraisals. Experienced in court testimony as qualified expert.

Dudley C. Carey, 116 Fairmeade Road, Louisville 7, Kentucky.
Territory: Not limited.
Specialization: Forest and wood utilization, wood preservation, wood seasoning, wood technology. Also wood conversion planning.

Carl M. Carpenter, Consulting Forester, Nashville, Indiana.
Territory: Indiana.
Specialization: 2, 4, 5, 6, 15, 16, 17, 18.

***Clifford B. Carts**, Consulting Forester Box 267, Coudersport, Pennsylvania.
Territory: Pennsylvania, New York, Ohio.
Specialization: 3, 4, 8, 10, 11, 15, 16, 17, 18. Also timber trespass and timber damage appraisal; management agent for timberland owners.

Ralph E. Chamberlin, Consulting Forester, River House 810, 2311 N. Front Street, Harrisburg, Pennsylvania.
Territory: Eastern United States.
Specialization: 2, 4, 15, 16, 17, 18. Also timber investment, farm and forest real estate, forest tree nurseries, Christmas tree management, and Harrisburg representative.

Charles Edward Cheston & Company, Forest Land Management Consultation, The University of the South, Sewanee, Tennessee.
Specialization: 2, 4, 6, 10, 11, 13, 15, 16, 17, 18, 20, 21.

Edward J. Clancy, 1916 Sylvan Road, S. W., Atlanta, Georgia.
Territory: Northern Georgia and adjoining states.
Specialization: 4, 15, 16, 17. Also agent for timber owners.

Stuart F. Clark, Consulting Forester, Box 3222, Bellaire, Texas.
Territory: Southern United States.
Specialization: Forest management, appraisals, investments.

Francis H. Clifton, Private Forester, P. O. Box 899; Office, 320 N. Boulevard, DeLand, Florida.
Territory: Southeast U. S. A.
Specialization: General forestry, registered real estate broker, forestry exhibits sales.

D. Irving Cobb, 447 W. French St., Willows, California.
Territory: California.
Specialization: 2, 3, 4, 8, 10, 15, 16, 17, 18.

***T. S. Coile**, Land Consultant, Rt. 2, Box 376, Durham, North Carolina.
Specialization: Soil productivity and its implications in forest land management. Soil surveys and their interpretation for forest management. Forest management planning based on integration of ecological and financial factors. Land evaluation.

Commercial Foresters, Inc., P. O. Box 1274, Asheville, North Carolina.
Forester: Richard A. Wood.
Territory: Appalachian and Southeastern.
Specialization: 2, 3, 4, 10, 11, 13, 16, 17, 18. Also complete timber marking and sale service and watershed management.

Connwood, Inc., P. O. Box 111, Rockfall, Connecticut.
Consultants: Ralph C. Hawley, Michael M. Pochan, Jr., Sherman H. Perkins.
Territory: Connecticut, Rhode Island, and adjacent areas.
Specialization: 3, 4, 10, 11, 13, 15, 17, 18, 19, 21.

David B. Cook, Consulting Forester, 12 McPherson Terrace, Albany 6, New York.
Territory: Eastern New York.
Specialization: Planted larch, chemi-peeling, and basal spray.

***Philip T. Coolidge**, Consulting Forester, retired. Box 102, Bangor, Maine.
General forestry.

William T. Cox, Consulting Forester and Biologist, 2186 Doswell Avenue, St. Paul 8, Minnesota.
Territory: General.
Specialization: Appraisals of forest properties; development of furbearers and other wildlife; selection of new locations for woodworking plants.

Porcius F. Crank, Jr., Consulting Forester, Point Harbor, Currituck County, North Carolina.
Territory: North Carolina and Virginia.
Specialization: 4, 5, 6, 7, 13, 15, 16, 17, 18. Also registered surveyor.

***Keith Cranston**, Leland, Mississippi.
Territory: Mississippi River Delta, entire Gulf Coast and Southeast hardwood bottomlands and pine types.
Specialization: Pine and bottomland hardwood management, and supplemental commercial cruising. Retained in consultant capacity by firms operating in the South, and as consultant-manager

for private landowners of bottomland hardwood and pine tracts. Appraisal of estates and division of lands. Loan appraisals.

John M. Crowl, Forrest Lane Drive, Madisonville, Kentucky.
Territory: Western Kentucky.
Specialization: 4, 5, 6, 13, 14, 16, 17, 18.

Robert L. Curtis, Consulting Forester and Licensed Surveyor, 536 Beverly Drive, Magnolia, N. J.
Territory, Midwest and Mid-Atlantic States.
Specialization: 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15, 16, 17, 18.

Lucas M. Dargan, Consulting Forester, Route #13, Darlington, South Carolina.
Territory: Coastal Carolinas.
Specialization: 4, 6, 9, 16, 17, 18.

***John F. Davis**, Ironshire and Mumford, Snow Hill, Maryland.
Territory: Eastern and Southeastern states.
Specialization: 2, 3, 4, 11, 13, 16, 17, 18.

Paul B. Davis, Consulting Forester, 118 E. Malta Road, Oak Ridge, Tennessee.
Territory: Tennessee, Kentucky.
Specialization: 1, 2, 3, 4, 13, 16, 17, 18.

Ralph A. Davis, Jr., Consulting forester and wood dealer, 2026 Avenue Q, Huntsville, Texas.
Territory: East Texas, Louisiana.
Specialization: 2, 3, 4, 10, 11, 13, 16, 17, 18. Also forest damage appraisal, land acquisition. Agent for absentee landowners, timber sales and cutting, supervision and loan appraisals.

Randle J. Dedeaux, Consulting Forester, P. O. Box 57, Perkinson, Mississippi.
Consultant: Randle J. Dedeaux.
Territory: Southern Mississippi; longleaf and slash pine types.
Specialization: 4, 13, 15, 17. Also growth studies, timber marking and marketing, and agent for absentee timberland owners.

Deep South Consulting Foresters, 961 Briarcliff Road, Tallahassee, Florida.
C. H. Schaeffer, Chief Forester.
Territory: Alabama and south Georgia.
Specialization: 4, 6, 16, 17.

Elwood L. Demmon, 241 Old Toll Road, Asheville, North Carolina.
Territory: Unlimited.
Specialization: Consultant on forest management policy for large forest properties; review and criticism of forestry research programs.

H. C. Dickerson, Consulting Forester, P. O. Box 348, Kilgore, Texas.
Territory: Texas and Louisiana.
Specialization: 2, 4, 5, 16, 18, and 19.

Di Stefano & Wessel, Attorneys and Counsellors at Law, 1411 Walnut Street, Philadelphia 2, Pennsylvania.
Consultant: Henry Wessel.
Territory: Northeast and Middle Atlantic Region.
Specialization: 2, 8, 11, 15, 16, 17. Also general business problems including the formation of partnerships, corporations, financing and litigation; timber sales, probate work, estate planning and taxation.

George L. Drake, Forest Consultant, 902 Puget Sound Bank Building, Tacoma 2, Washington.
Territory: Western United States, Canada, and Alaska.
Specialization: 2, 4, 6, 7, 8, 10, 15, 16, 17.

Eastern Forestry, Inc., Box 129, Hampton, Virginia.
Consulting Forester: *Edward Stuart, Jr.
Territory: Eastern U. S.
Specialization: 2, 3, 4, 10, 11, 13, 14, 15, 16, 17, 18. Also timberland investment counsel.

William A. Eastman, Jr., Consulting Forester, William A. Eastman & Co., Inc., 410 Green Building, Seattle 1, Washington.
Territory: Pacific Northwest.
Specialization: 10, 15, 16, 17, 18. Also preparation and administration of timber sales, land appraisal, timberland brokerage, and timberland management.

James E. Ebert, Consulting Forester, Pembroke, North Carolina.
Territory: Eastern North Carolina.
Specialization: 4, 6, 13, 16, 17.

W. G. Edwards, 503 West Fairmount Ave., State College, Pennsylvania.
Specialization: 3, 10, 13, 15, 16, 18. Also small sawmill problems, both logging and milling phases.

Inman F. Eldredge, Sr., 1354 Moss Street, New Orleans 19, Louisiana.
Territory: Lower South.
Specialization: Resource surveys for large operations; advice and counsel in large-scale land purchase programs; consultation with forestry staffs on management policy and practice in larger operations.

Employment Service, Forestry Personnel, Leland, Mississippi.
Consultant: *Keith Cranston, Personnel director.
Specialization: Personnel placement service provided professional foresters and timbermen. Service to industry.

L. J. Enright, Consulting Forester, 322 Scott Drive, Silver Spring, Maryland.
Territory: Maryland; not limited.
Specialization: 1, 6, 15, 18. Also park management and policy; landscape planting and design.

Farmcraft Associates, Inc., Forest Managers, 619 Washington Street (Box 4344), Alexandria, Louisiana, Box 293, Eunice, Louisiana, and 120 N. Eighth St., Oakdale, Louisiana.
Consultants: John P. Carroll and Printis E. Murphy.
Territory: Southern U. S.
Specialization: Forest investments and technical forest management for private and industrial holdings. Also litigation and damage appraisals.

***David S. Findlay**, Consulting Forester, 20 East 5th Street, Jamestown, New York.
Territory: Western New York and Pennsylvania.
Specialization: 4, 15, 16, 17.

Reginald D. Forbes, Consulting Forester, R.F.D. 1, Ambler, Pennsylvania.
Territory: Eastern U. S.
Specialization: 4, 6, 17, 18. Also forest resource surveys of timber available to manufacturing plants in specified territories.

Forest Land Management Co., P. O. Box 1046, Morgantown, West Virginia.
Consultant: *Thomas G. Clark.
Territory: West Virginia, western Pennsylvania, western Maryland.
Specialization: Forest land appraisal, forest real estate, timber sales, and markets.

Forest Products Management Company, 1504 Broad Street, Camden, South Carolina.
Consultant: *H. R. Oliver.
Territory: Southern states.
Specialization: 2, 3, 4, 6, 7, 11, 15, 16, 17, 18. Also land appraisals, timber and land sales and bottomland hardwood management.

Forest Services, Inc., 907 Persons Building, P. O. Box 1112, Macon, Georgia.
Consultant: Reuben W. Martin, Jr.
Territory. Southern states.
Specialization: 4, 7, 8, 13, 15, 16, 17, 18. Also aerial application of herbicides and insecticides, direct seeding from fixed wing aircraft or helicopter and contract tree planting.

Forestry Associates, Inc., P. O. Box 72, Hart, Michigan.
Consultants: Eugene R. Kuhne, Royce E. Mossholder, foresters.
Territory: Michigan.
Specialization: 3, 4, 5, 6, 7, 9, 11, 13, 15, 16, 17, and 18.

Forestry Consulting Services, Deluxe Building, 297 West Michigan Avenue, Jackson, Michigan.
Consultant: *George D. Blair, registered forester.
Territory: Nationwide.
Specialization: 1, 2, 4, 11, 16, 19. Also various forest growth and vegetative control planning services to public utility industry.

Forestry Suppliers, Inc., Consulting Foresters and Suppliers, Battlefield Station, Jackson 4, Mississippi.
Consultants: *James W. Craig, Ivo W. Miller, and Purvis R. Huff.
Territory: Gulf States.
Specialization: 3, 4, 6, 13, 15, 16, 17, 18. Also forest land analysis and management, growth studies, timber and land sales, and a complete line of supplies and equipment for foresters and timber owners.

John S. Forrest, Consulting Forester, 198 Maxwell, Eugene, Oregon.
Territory: Douglas-fir region.
Specialization: 2, 3, 4, 6, 15, 16, 17, 18. Also negotiation and administration of private timber sale contracts; aerial photography procurement contracts; property management for absentee owners; industrial inventory and sustained yield programs.

E. A. Foster, 204 E. Azalea St., Lakeland, Florida.
Territory: Southeastern United States.
Specialization: 2, 4, 5, 6, 7, 8, 13, 15, 16, 17, 18. Also timber marketing services and aerial photo interpretation.

Harvey R. Frantz, Forest Consultant, 1926 Jennings St., Bethlehem, Pennsylvania.
Territory: Eastern United States and Latin America.
Specialization: 3, 4, 11, 13, 16, 17.

***R. C. Fraunberger**, Forest Products Business Consultant (registered forester), 626 Black Rock Road, Bryn Mawr, Pennsylvania.
Specialization: 2, 3, 4, 10, 11, 16, 17, especially in hardwoods, domestic and foreign.

E. A. Friend, Jr., 1008 Delaware Avenue, Suffolk, Virginia. (Inactive.)
Territory: Tidewater and Eastern Shore of Virginia, northeast North Carolina.
Specialization: 4, 15, 16, 17. Absentee landowners' agent, damage, trespass, and condemnation claims.

Emanuel Fritz, Consulting Forester, 102 The Uplands, Berkeley 5, California. In association with E. T. F. Wohlenberg, 37 Highland Circle, Ukiah, California.
Territory: West; pine, redwood, and fir.
Specialization: 2, 3, 4, 6, 10, 11, 16, 17, 18, 19, 20, 21. Also consultant on state forest and park management and policy.

LeRoy Frontz, Consulting Forester, Allenwood, Pennsylvania.
Territory: Eastern U. S.
Specialization: 3, 4, 5, 6, 7, 9, 16, 17, 18. Also landscaping, forest and ornamental nurseries, farm forestry, forest parks and recreation, landuse planning, soil conservation, farm evaluation and appraisal.

Edward P. Furlow, 810 Gouthier Road, Falls Church, Virginia.
Territory: Virginia, Maryland, West Virginia.
Specialization: 4, 13, 16, 17, 18.

Good Forest Management Co., Vernon A. Good, Consulting Forester, American Bank Building, Portland, Oregon.
Territory: Oregon, Washington, Idaho, northern California.
Specialization: 2, 4, 8, 13, 14, 16, 17, 18. Forest property management, timber marking, sales contracts and supervision, acquisition, aerial photo inventory, fire damage appraisals, and timber tax assistance. Also watershed and land use management.

Paul N. Goodmonson, Consulting Forester, 1355 Alta Vista Drive, Corvallis, Oregon.
Territory: Oregon, Washington, northern California.
Specialization: 3, 4, 9, 13, 15, 16, 17, 19. Complete timberland management, timber sales, timber and land acquisition, and agent for absentee forest owners.

M. W. Gormely, B.C.R.F., P. Eng., Industrial and Consulting Forestry Service, Room 413, Dominion Bldg., 207 West Hastings St., Vancouver 3, B.C.
Territory: British Columbia: (No regional limitation).
Specialization: 2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 15, 16, 17, 18. Also fire damage appraisal and timber insurance evaluation.

R. W. Graeber, Consulting Forester, 303 Hillcrest Road, Raleigh, North Carolina.
Territory: North Carolina.
Specialization: 4, 6, 13, 16, 17, 18. Also buying and selling timber and timberlands as service to either buyer or seller; adjusting problems arising from over-cutting or trespass.

Joseph F. Gray, Consulting Forester, R. D. #1, Kittanning, Pennsylvania.
Territory: Pennsylvania.
Specialization: Christmas tree plantation management.

Greenacres, Inc. Forest Management and Investment Consultants, 3604 Genesee St., Seattle 8, Washington.
Consultants: M. P. Lazara, Perry O. Donaldson, Arthur H. Pedersen, J. C. H. Robertson, Ben S. Bryant, and C. S. Cowan, Fellow SAF.
Territory: Western North America, Central America, Southeast Asia.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 18, 21. Forest investment consulting and tree farm acquisition and management. Complete feasibility studies and development plans for tropical operations.

Green's Timber Service, Johnson City, Tennessee.
Consultant: L. Stanley Green.
Territory: Southeastern U. S.
Specialization: 2, 3, 4, 6, 10, 13, 16, 17, 18. Also custom sawmilling.

W. H. Griffith, Forester and Surveyor, 1001 Ouchita Bank Building, Monroe, Louisiana.
Territory: Southern United States.
Specialization: 15, 16, 17.

***John G. Guthrie**, Consulting Forester, Wiggins, Mississippi.
Territory: Mississippi and adjacent territory.
Specialization: 4, 6, 12, 13, 16, 17, 18. Also agent for absentee owners. Land sales and acquisition. Timber stand improvement (weed tree elimination). Long-term management. Large scale planting. Timber marking and marketing.

Alvin B. Hafer, Consulting Forester, Laurinburg, North Carolina.
Territory: North Carolina, South Carolina, and Southeast.
Specialization: 4, 15, 16, 17. Also purchase and sale of timbered properties.

E. C. Haff, Consulting Forester, 836 Edisto Ave., Orangeburg, South Carolina.
Specialization: Managing forest lands.

***Albert G. Hall and Associates**, 810 18th Street, N. W., Washington 6, D. C.
Consultants: *Charles M. Schwartz, McClain B. Smith, Jr.
Specialization: 2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 16, 17, 18. Also Washington representative.

Giles G. Hall, Professional Forester, 402 Cumberland Avenue, North Augusta, South Carolina.
Territory: South Carolina, Georgia.
Specialization: 2, 3, 4, 5, 6, 7, 10, 11, 13, 16, 17, 18. Also tree pruning in planted stands.

***Jack M. Hall**, Consulting Forester, P. O. Box 285, Moultrie, Georgia.
Territory: Georgia, Florida, Alabama, and South Carolina.
Specialization: 4, 5, 6, 7, 11, 12, 15, 16, 17, 18. Also contract tree planting and fire plow planting preparation.

Francis G. Hambrook, Consulting Forester, East Sandwich, New Hampshire (mailing address, R.F.D., Center Harbor, N. H.).
Territory: New Hampshire.
Specialization: 2, 4, 15, 17. Also management of timber properties and agent for absentee landowners, selective cutting, timber marking and marketing assistance, timber stand improvement work, including improvement cuttings in immature stands.

Hammon, Jensen, and Wallen, Mapping and Forestry Services, 660 Hegenberger Road, Oakland 21, California.
Consultants: Herbert A. Jensen, *Arnold F. Wallen.
Territory: United States, Central and South America, and foreign.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 18. Also planimetric and topographic mapping, land net delineation, general land classification for appraisal purposes and ranchland management, and aerial photogrammetric consulting service.

David H. Hanaburgh, Consulting Forester, Buchanan, New York.
Territory: Anywhere.
Specialization: 2, 3, 4, 9, 10, 11, 13, 16, 17. Also negotiation of rights for hunting, fishing, trapping and water storage.

Joseph F. Hardee, Consulting Forester, Route 7, Raleigh, North Carolina.
Territory: North Carolina, South Carolina, and Virginia.
Specialization: 3, 4, 13, 16, 17, 18. Also timber and timberland acquisition and sales.

Gene M. Harris, Registered Consulting Forester, 2112 Hagan Drive, Tallahassee, Florida.
Territory: Florida, Georgia, and Alabama.
Specialization: 3, 4, 5, 6, 7, 8, 9, 12, 13, 15, 16, 17, 18.

***Arthur W. Hartman**, Consulting Forester, 22 Princeton Way, N. E., Atlanta, Georgia.
Territory: Southern states.
Specialization: 4, 6. Prescribed burning, development planning, training and execution in silvicultural uses of fire with planned management of southern pines and for control of hazardous fuels. Also, fire protection planning, especially determining components

of balanced mechanized fire control facilities and their tactical uses. (Registered forester, Georgia.)

Joseph F. Havel, Box 11, Pawley's Island and Georgetown, South Carolina.
Territory: North Carolina, South Carolina, Georgia, and Florida.
Specialization: 3, 4, 10, 11, 13, 16, 17.

E. T. Hawes, Consulting Forester, 2204 White Oak Drive, Valdosta, Georgia.
Territory: Southeast.
Specialization: 2, 4, 8, 11, 12, 13, 16, 17, 18.

Ralph W. Hayes, Consulting Forester, 2241 Myrtle Avenue, Baton Rouge, Louisiana.
Territory: Gulf States.
Specialization: 2, 3, 13, 15, 16, 17. Also investigation and settlement of claims regarding timber in use in the South.

George S. Haynes, Consulting Forester, S. 321 Bowdish Road, Opportunity, Washington.
Territory: Western Montana, northern Idaho, eastern Washington.
Specialization: 4, 6, 10, 15, 16, 17, 18.

V. W. Herlevich, Consulting Forester, 802 Forest Hills Drive, Wilmington, North Carolina.
Territory: North Carolina, South Carolina.
Specialization: 4, 6, 15, 16, 17. Also forest fire damage appraisals.

***Halsey M. Hicks,** Consulting Forester, Box 575, Brattleboro, Vermont.
Territory: Not limited.
Specialization: 2, 3, 4, 8, 15, 16, 17.

Monterey L. Holst, Consulting Forester, P. O. Box 125, East Greenwich, Rhode Island.
Specialization: 3, 4, 6, 9, 10, 13, 15, 16, 17, 18, 21.

Gion B. Hooker, 1072 Anzio St., Crescent City, California.
Territory: Northern California.
Specialization: 4, 15, 16, 17.

Douglas F. Horan, Consulting Forester, 316 Windsor Street, Lakeland, Florida.
Territory: Southeastern United States, Central and South America.
Specialization: Complete timber sales service, foreign timber investigations, agent for absentee timber owners.

***William P. House,** Consulting Forester, Chesham, New Hampshire (R.F.D. Marlboro.)
Territory: New Hampshire and adjacent areas.
Specialization: 2, 3, 4, 16, 17. Marking and stumpage sales.

Milford C. Howard, Forester, 24 Evelyn Road, Port Washington, New York.
Territory: East, South and Midwest.
Specialization: 1, 2, 4, 9, 15, 16. Also acquisition and management of recreation and investment properties.

Richard F. Howard, Forestwald, Box 14, Franklinville, New York.
Territory: Pennsylvania, New York, New England.
Specialization: 3, 4, 6, 15, 16, 17, 18.

***T. M. Howerton, Jr.,** Forestry Consultant, Madison, Florida.
Territory: Southeastern states.
Specialization: Marketing, management, and forestry supplies.

John E. Hudson, 806 N. W. 21st Terrace, Gainesville, Florida, or 57 N. Bay View Avenue, Fairhope, Alabama.
Territory: Southeastern United States.
Specialization: 4, 12, 16, 17.

Gustaf W. Hult, Consulting Forester, 3029 Johnson Street, Corvallis, Oregon.
Territory: Oregon, California.
Specialization: 4, 16, 17. Forest fire insurance investigations. Timber sales, acquisition, and exchanges.

LeRoy W. Huntington, Consulting Tropical Forester, 870 Wesley Street, Baldwin, New York.
Territory: Latin America, Orient, Africa.
Specialization: 2, 3, 4, 10, 11, 15, 16, 17, 18; and tropical hardwoods.

R. Wilson Hutchison, Consulting Forester and Logging Engineer, 167 Walnut Lane, Eugene, Oregon.
Territory: Washington, Oregon, California.
Specialization: 2, 3, 4, 6, 10, 15, 16, 17. Registered professional engineer of the State of Oregon.

Intermountain Timber Service, 4101 State Street, Boise, Idaho.
Consultant: *Thomas C. Clifton.
Territory: Idaho, northern California, eastern Oregon.
Specialization: 2, 4, 6, 8, 15, 16, 17. Also logging road construction cost studies, and logging cost studies made. Buying and selling of timber and timberlands as a service to either buyer or seller.

Gorham E. Jackson, Consulting Forester, 604 West Main Street, Washington, North Carolina.
Territory: Eastern North Carolina, southeastern Virginia. All forest types.
Specialization: 2, 4, 6, 9, 10, 13, 15, 16, 17, 18. Also investigations of forest resources for pulp and paper companies, and land agent for absentee timberland owners.

William E. Jackson, Jr., Forest Engineer, R. F. D. #1, Lexington, Kentucky.
Territory: No limitations.
Specialization: Timberland evaluation, acquisition, investments, management, marketing, litigation and damage appraisal, forest taxation.

Norman G. Jacobson, Consulting Forester, 620 Security Building, Tacoma, Washington.
Specialization: Forest management, forest protection, timber and land appraisal, taxation and forestry policy.

Alex J. Jaenicke, 2941 Mulkey St., Corvallis, Oregon.
Territory: Oregon, Washington, California, Idaho, and Montana.
Specialization: 4, 5, 7. Also volume estimates of insect- and disease-killed timber and rates of deterioration for management and taxation purposes.

David G. Jennings, Consulting Forester, P. O. Box 467, Port Jefferson, New York.
Territory: New York.
Specialization: 1, 3, 4, 6, 15, 18.

***F. J. G. Johnson and Associates, Ltd.,** Suite 605, 325 Howe Street, Vancouver 1, B. C., Canada.
Territory: British Columbia (no regional limitation).
Specialization: 2, 3, 4, 6, 11, 15, 16, 17.

Ralph S. Johnson, Laurinburg, North Carolina.
Territory: Eastern Carolinas.
Specialization: 3, 4, 6, 13, 15, 16, 17.

E. V. Jotter, Consulting Forester, 30 Cedarlawn Drive, Dayton 5, Ohio.
Territory: Ohio, Kentucky.
Specialization: 3, 4, 6, 9, 11, 16, 17, 18. Also development and management of community forests, conservation education, cooperation with soil conservation districts.

Frank E. Karpick, 130 Kay St., Buffalo, 15, New York.
Territory: Northeastern United States.
Specialization: Planning and maintenance programs for municipal shade trees.

***The S. G. Keedwell Company,** Consulting Foresters, Emporia, Virginia.
Territory: Eastern and southern U. S.
Specialization: 3, 4, 10, 11, 13, 15, 16, 17. Also forest litigation and purchase and sale of land and timber.

John F. Kellogg, Forester, Box 135, Elizabeth, Louisiana.
Territory: Louisiana; pine and hardwood.
Specialization: 4, 5, 11, 16, 17.

***George C. Kiefer, Jr.,** Consulting Forester, Salisbury, Connecticut.
Territory: Southern New England, eastern New York.
Specialization: 4, 6, 8, 15, 16, 17, 18. Also management of timber properties and plantations, timber marking and marketing, watershed management, and agent for woodland owners.

H. Thorn King, Consulting Forester and Land Surveyor, Hancock, New Hampshire.
Territory: Southwestern New Hampshire.
Specialization: 2, 3, 4, 15, 16, 17, 18. Also tree farming; marking; registered land surveyor.

G. Ed. Knapp, Consulting Forester, 1410 Broadway, Macon, Georgia.
Associate: Donald L. Martindale. (Both registered foresters.)
Territory: Southern states.
Specialization: 2, 3, 4, 10, 11, 13, 16, 17. 18.

Robert F. Knoth & Company, Foresters, Appraisers, Surveyors, 132 East Bay Street, Charleston 3, South Carolina.
Consultant: *Robert F. Knoth.
Territory: Domestic and foreign.
Specialization: 4, 6, 10, 11, 13, 15, 16, 17, 18. Land agent for ab-

sentee timberland owners; foreign timberland investigations; veneer log procurement; timber acquisitions; sales, investments, and loans.

Arthur Koehler, Wood Technologist, 1959 Thayer Ave., Los Angeles 25, California.
Specialization: Wood utilization.

J. Hugo Kraemer Associates, Consulting Foresters, 249 Lark Street, Albany 10, New York.
Territory: New York and New England.
Specialization: 2, 3, 4, 6, 11, 15, 16, 17, 18, 21. Also timberland management and research projects.

Cornelius W. Kuhn, R. D. #2, Cattaraugus, New York.
Specialization: Timber evaluation and small woodlot problems.

Clifton LaBree, Forest Consultant, 86 Gabrielle Street, Manchester, New Hampshire.
Territory: Northeastern United States.
Specialization: 2, 3, 4, 5, 6, 7, 8, 10, 13, 15, 16, 17, 18. Also timber sales, long-term forest land leases or management contracts, and land surveying.

F. Bruce Lamb, Tropical Forestry Consultant, Box 327, Canon City, Colorado.
Territory: Mexico, Central and South America, and Caribbean Islands.
Specialization: 2, 3, 4, 10, 11, 15, 16, 17, 18. Mahogany and other tropical hardwoods.

William N. Lane, Forest Management Consultant, Crown Point Road, Rochester, New Hampshire.
Territory: Northeastern United States.
Specialization: 2, 3, 4, 5, 6, 7, 8, 11, 13, 15, 16, 17, 18. Also damage surveys, forest litigation, timber depletion accounting, and timber investment reports.

The Langdale Company, P. O. Box 980, Valdosta, Georgia.
Consultants: Harley Langdale, Jr., T. E. Connell.
Territory: Georgia, northern Florida; slash pine belt.
Specialization: 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19.

***Frank M. Langford**, Waverly, Tennessee.
Territory: Middle Tennessee, south Kentucky, and north Alabama.
Specialization: Timber real estate —evaluations. Utilization specialist in hardwoods.

D. E. Lauderburn, 1204 Adeline St., Hattiesburg, Mississippi.
Territory: South Mississippi and adjacent territory.
Specialization: 2, 3, 4, 11, 12, 13, 16, 17. Timber sales service including marking, supervision, and inspection.

Frank J. Lemieux, Consulting Forester, 833 Whitney Building, New Orleans, Louisiana.
Territory: Southern states, Mexico, Central and South America.
Specialization: 2, 4, 6, 13, 15, 16, 17.

Paul C. Lemon, Consulting Forester, State College, Albany 3, New York.
Territory: New York and New England.
Specialization: 1, 6, 9, 14. Also commercial pilot, applications of aviation to forestry.

T. A. Liefeld, Consulting Forester, Thomasville, Georgia.
Territory: Florida, Georgia.
Specialization: 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 15, 16, 17, 18.

L. D. Lloyd, Consulting Forest and Logging Engineer, Flying L Ranch, Glenwood, Washington.
Territory: Worldwide.
Specialization: 2, 3, 4, 6, 8, 10, 13, 15, 16, 17.

Harvey J. Loughead, Consulting Forester, 399 Vanderbilt Road, Biltmore, Station, Asheville, North Carolina.
Territory: Eastern U. S.
Specialization: 3, 4, 12, 13, 16, 17. Also watershed management.

Robert T. MacDougall, Jr., 124 Cresta Drive, Ukiah, California.
Territory: Coast pine and southern redwood regions of California.
Specialization: Timber cruising, forest management, mapping.

***Donald K. Maissurow**, Consulting Forester, New Haven Avenue, Derby, Connecticut.
Territory: New England.
Specialization: 1, 4, 15, 16, 17. Also landscape forestry.

A. R. Maris, Box 122, Forks, Washington.
Territory: Olympic Penninsula of Washington state.
Specialization: Logging engineering, timber cruising, land surveying, tree farms, and all general forestry work including land appraisals.

Carol W. Marlow, 4232 Redonda Lane, Dayton 6, Ohio.
Territory: Ohio.
Specialization: 1, 5, 7. City shade tree maintenance programs.

E. D. Marshall, Consultant in Forest Products, 403 Court Ave., Ventura, California.
Territory: Western United States, Mexico, Central and South America.
Specialization: 3, 4, 11, 13, 16, 17, 19, 20, 21.

Raymond H. Marshall, Consulting Forester and Land Surveyor, 5 Pine Street, Littleton, New Hampshire.
Territory: Northern New Hampshire and Vermont.
Specialization: 3, 4, 6, 13, 15, 16, 17, 18.

Clyde S. Martin, Forest Consultant, 902 Puget Sound Bank Building, Tacoma 2, Washington.
Territory: Western United States and Canada.
Specialization: 2, 4, 6, 7, 8, 10, 15, 16, 17.

William Maughan, Consulting Forester, 5 Sylvan Road, Durham, North Carolina.
Territory: Southeastern United States.
Specialization: 2, 3, 4, 8, 16, 17, 18.

***Edward A. McAllister**, 311 Lynchburg Avenue, Colonial Heights, Virginia.
Territory: Virginia and Southeast.
Specialization: 3, 4, 9, 10, 11, 13, 16, 17.

Earl M. McChesney, Consulting Forester, 57 New York Street, Bangor, Maine.
Specialization: 1, 4, 15, 16, 17, 18.

The Ben Meadows Co., 315 Pharr Road, N. E., Atlanta, Georgia.
Consultant: *Ben C. Meadows.
Territory: Southeast.
Specialization: 4, 11, 13, 16, 17. Also complete line of forestry tools and equipment for the forester and timber owner.

Fred B. Merrill, Consulting Forester, Box 261, Clinton, Louisiana.
Territory: Mississippi and Louisiana, within 100 miles of Baton Rouge.
Specialization: 4, 5, 6, 7, 11, 13, 16, 17. Also buying and selling timberlands; training estate and company personnel; and Gaylord pulpwood dealer in East and West Feliciana Parishes.

***James W. Meteer**, Consulting Forester, R. D. 6, Wooster, Ohio.
Territory: Not limited.
Specialization: 2, 3, 4, 11, 16, 17, 18. Also Christmas tree management. Specialist in continuous forest inventory.

William H. Meyer, Consulting Forester, West Rupert, Vermont.
Territory: Northeast.
Specialization: 3, 4, 9, 11, 16, 17, 18. Also farm management and conservation education.

Richard V. Miles, III, Consulting Forester, 1006 First National Bank Bldg., Tuscaloosa, Alabama.
Specialization: 4, 8, 11, 13, 15, 16, 17, 18.

Raymond M. Miller, Consulting Forester, P. O. Box 802, Jamestown, New York.
Territory: Pennsylvania, New York.
Specialization: 4, 16, 17. Also timber and lumber marketing service.

Milliken Forestry Co., Box 5404, Shop Road, Columbia, South Carolina.
Consulting Foresters: William F. Milliken, K. M. Allan, Monroe F. Greene, James R. Catheart.
Territory: Southeast, principally South Carolina.
Specialization: 3, 4, 6, 11, 13, 15, 16, 17, 18. Also tree planting; agent for absentee owners; hardwood-pine conversion work.

Walter L. Mills, Forester, 2308 Church Street, P. O. Box 21, Selma, Alabama.
Territory: Southeast.
Specialization: 2, 3, 4, 5, 6, 7, 10, 13, 16, 17, 18.

***William J. Mills**, Forest Engineer, 201 Volunteer Building, Chattanooga 2, Tennessee.
Territory: Southeastern states, Mexico.
Specialization: 3, 4, 11, 13, 15, 16, 17.

R. B. Milne, Consulting Forester, Box 371, Petersburg, Virginia.
Territory: Eastern states; all forest types.
Specialization: 3, 4, 10, 16, 17.

Stuart Moir, Forest Counsel, Diamond Head Road, Oswego, Oregon.
Territory: Western United States, British Columbia, Alberta, Canada.

***Robert Moore**, Consulting Forester, Danville, Pennsylvania.
Territory: Not restricted.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 18, 19. Also bankruptcy cases, trade association work, land purchase and sales, timber buying, selling, and appraising. Licensed real estate broker, trusteeship cases, litigation and damage claims, and estate problems.

R. A. Morin, Consulting Forester, 2532 Sunset Ave., Greenville, North Carolina.
Territory: Eastern North Carolina.
Specialization: 4, 13, 16, 17, 18. Also growth studies, timber marking and marketing, and agent for absentee timberland owners.

George W. Morrill, Jr., Consulting Forester, R. F. D. #3, Concord, New Hampshire.
Territory: New Hampshire, Maine, Vermont.
Specialization: 4, 13, 15, 16, 18. Also landscaping, forest recreation, and beautification.

***Peter R. Mount**, Consulting Forester, Route #3, Kingston Springs, Tennessee.
Territory: Kentucky-Tennessee, Tennessee River Valley.
Specialization: 2, 3, 4, 8, 10, 11, 15, 16, 17, 18.

Charles H. Moyer, Consulting Forester, R. F. D. #2, Newfield, New York.
Territory: Northeast.
Specialization: 4, 10, 15, 16, 17.

National Timber Consultants, Box 497, Salem, Missouri.
Consultants: Ed Woods, Charles Kirk.
Territory: Central and southern states.
Specialization: Management information, land appraisal and valuation, mapping and estimating.

Chris Nelson, Jr., Consulting Forester, 500 College St., Jasper, Texas.
Territory: Southern and southwestern United States and tropical America.
Specialization: 3, 4, 16, 17, 18.

New England Forestry Foundation, 3 Joy Street, Boston 8, Massachusetts.
Consultants: *J. Milton Attridge, Stanley B. Coville, Frederic P. Elwert, Kenneth E. Jones, Benjamin W. Nason,, Allan W. Plumb, Donald R. Poppema, Frederick J. Payne, Robert F. Creesy, Fred A. Huntress, Jr., Allen P. Doe, Harrison S. Ripley.
Territory: New England.
Specialization: 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, 18.

New England Silvicultural Service, Athol Road, Petersham, Massachussetts.
Consultant: Fred M. Hunt.
Territory: Central New England.
Specialization: 4, 10, 15, 16, 17, 18. Also management of pine plantations.

S. A. Newman, Forest Engineers, P. O. Box 156, Everett, Washington.
Territory: Washington.
Specialization: 8, 10, 15, 16, 17.

Nittany Timberlands, Inc., 124 Osmond St., State College, Pennsylvania.
Consultants: R. A. Bartoo, Orvel A. Schmidt, Rex F. Melton, and Frank J. Wawrynovic.
Territory: Pennsylvania.
Specialization: 4, 9, 13, 16, 17, 18.

***Leon A. Nix**, Consulting Forester and Logging Engineer, 260 N. Main St., Brampton, Ontario, Canada.
Territory: Not limited.
Specialization: 2, 3, 4, 6, 10, 13, 15, 16, 17. Also farm woodlot management.

Northeast Forestry Service, Inc., First National Bank Bldg., Hawley, Pennsylvania.
Stanley Mesavage, Consulting forester.
Territory: New York, New Jersey, and Pennsylvania.
Specialization: 3, 4, 10, 11, 15, 16, 17.

Northern Timber Services, Curtis R. Lytle, Consulting Forester, Box 365, Wellsboro, Pennsylvania.
Territory: North central Pennsylvania.
Specialization: 4. Also sugar-bush and Christmas tree management.

Northern Tree Co., Inc., Petoskey, Michigan.
Consultants: *Thomas F. Schweigert, George E. Young, and William J. McDowell, and Ted R. Miller.
Territory: Michigan.
Specialization: 1, 4, 5, 6, 7, 15, 16, 17, 18. Also contract tree planting; registered land surveyor.

Ernest Nutting, Consulting Forester, Box 51, Camden, South Carolina.
Territory: The Carolinas and Georgia.
Specialization: 4, 13, 15, 16, 17, 18.

W. R. Owens, Consulting Forester, 3902 North Street, Nacogdoches, Texas.
Territory: Texas, Louisiana, Arkansas, Oklahoma, New Mexico.
Specialization: 15, 16, 17. Complete timber management, investigations for legal actions involving timber or timberland. Also registered public surveyor.

***Charles R. Page, Jr.**, Forest Land Manager and Consultant, 415 Friar Road, Chattanooga 11, Tennessee.
Territory: Southeastern states.
Specialization: 3, 4, 5, 6, 7, 11, 15, 16, 17, 18.

Pomeroy & McGowin, Forest Managers, Monticello, Arkansas, and Chapman, Alabama.
Consultants: L. K. Pomeroy, Julian F. McGowin (S.A.F. Associate Member), *Z. W. White, T. R. Scott, Jr., W. V. Gandy, D. W. Samson, D. L. Harper, H. C. Pennington, and A. C. Patton.
Territory: Southern states, South America.
Specialization: 4, 8, 11, 13, 16, 17, 18. Also aerial forest surveys.

Pond & Moyer, Inc., Co., Consulting Foresters, 107 Homestead Road, Ithaca, New York.
Consultant: *James D. Pond.
Territory, New York and Northeast, Latin America, northern hardwoods, spruce-fir, central hardwoods, tropical woods.
Specialization: 2, 3, 4, 8, 10, 11, 13, 15, 16, 17.

Prentiss & Carlisle Company, Inc., Timberland Service — Engineers, 107 Court Street, Bangor, Maine.
Consultants: George T. Carlisle, Philip P. Clement, Robert W. Averill, George D. Carlisle, Edward K. Brann, William D. Barron, and Vladek Kolman.
Territory: United States, Canada.
Specialization: 2, 3, 4, 8, 10, 11, 13, 15, 16, 17, 18.

W. H. Price, Forest Consultant, 2626 West Lynn Street, Seattle 9, Washington.
Specialization: 1, 4, 6, 7, 8, 16, 17.

John G. Rawls Co., Consulting Foresters, 2793 Pinewood Drive, Macon, Georgia.
Consultant: John G. Rawls (S.A.F. Affiliate Member).
Territory: Southeast.
Specialization: 10, 12, 13, 15, 16, 17.

A. B. Recknagel, P. O. Box 15, Ithaca, New York.
Territory: Anywhere in United States and British Columbia.
Specialization: Forest management, forest utilization (particularly pulp and paper).

***Owen L. Riley**, Consulting Forester, P. O. Box 31, Pine Mt. Valley, Georgia.
Territory: Georgia and Alabama.
Specialization: 4, 6, 7, 9, 11, 16, 17, 18. Also agent for timberland owners; timber marketing and assistance; damage appraisal.

Robinson Improvement Company, St. Augustine National Bank, St. Augustine, Florida.
Consultant: Allen D. Nease.
Territory: Florida and south Georgia.
Specialization: 2, 3, 4, 5, 6, 7, 9, 12, 13, 15, 16, 17, 18.

A. P. Russell, Consulting Forester, 11 Maplewood Drive, Sumter, South Carolina.
Territory: Unlimited, principally southern region.
Specialization: 2, 3, 4, 10, 11, 13, 15, 16, 17, 18. Also forest resource surveys for industry, specializing in southern hardwoods.

Sable Mountain Corporation, 68 Phillips Street, Rutland, Vermont.
Consultant: *Richard C. Rose.
Territory: Central Vermont.
Specialization: Woodland management, including marking and marketing of standing timber

and trained work crew for planting, pruning, and timber stand improvement. Also operate own forest.

Eino Sainio, Consulting Forester, 320 W. Helen St., Newberry, Michigan.
Territory: Eastern Upper Peninsula of Michigan.
Specialization: 3, 4, 13, 15, 16, 17. Registered land surveyor and registered forester.

Paul M. Sanders, Consulting Forester, 916 Yeon Bldg., Portland 4, Oregon.
Territory: Unrestricted.
Specialization: 2, 4, 6, 8, 15, 16, 17, 18. Property management for absentee owners.

Roy Dale Sanders, Visual Education Technician, Rural Route 6, Evrodale, Brainerd, Minnesota.
Territory: Unlimited.
Specialization: Forester, wildlife technician, photographer. The entire production supervision of 16 millimeter color educational motion pictures, including script writing, direction, photography, editing, and sound supervision. Also production of color and black and white still picture visual education material.

Sandhill Forestry Company, 206 Surginor Road, Rockingham, North Carolina.
Consultant: *Walter J. Marshburn, Jr.
Territory: Southeastern United States.
Specialization: 3, 4, 6, 13, 16, 17, 18. Also woodland property sales.

***L. E. Sawyer**, R. R. #1, West Terre Haute, Indiana.
Territory: Indiana, Illinois, western Kentucky.
Specialization: 4, 5, 6, 7, 16, 17, 18.

Joseph A. Schmidt, Consulting Forester, Box 470, Charleston, South Carolina.
Territory: Southeast.
Specialization: 4, 13, 15, 16, 17. Also growth studies, timber marking.

William R. Schofield, Forest Engineer & licensed Civil Engineer, 681 Market Street, San Francisco 5, California.
Territory: California.
Specialization: 5, 6, 7, 8, 15, 16, 18.

C. D. Schultz & Co., Inc., Forestry and Engineering Consultants, 545 White-Henry-Stuart Building, Seattle, Washington.
Consultant: C. D. Schultz.
Territory: Arizona, Oregon, Washington, California mainly; but no regional limitations.
Specialization: 2, 3, 4, 6, 8, 10, 11, 15, 16, 17, 18, 20.

C. D. Schultz & Co., Ltd., Forestry and Engineering Consultants, 325 Howe Street, Vancouver, British Columbia.
Consultants: C. D. Schultz and 46 members of the Canadian Institute of Forestry. Present staff 12 members.
Territory: No regional limitations.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 18, 19, 20.

James W. Sewall Company, Consulting Foresters, Old Town, Maine, and Fredericton, New Brunswick, Canada.
Consultants: Frank M. Call, Elmer G. Kelso, Charles Slight, Carleton C. Young, Jr., Theodore C. Tryon, Earl W. Raymond, Edwin Forsythe.
Territory: Northeast.
Specialization: 3, 4, 5, 8, 13, 15, 16, 17, 18. Also aerial photography.

R. B. Shannon & Associates, Professional Engineers, Registered Surveyors, Consulting Foresters, Box 23, Kittanning, Pennsylvania; also Indiana, Pennsylvania.
Consultants: *Robert B. Shannon, Maurice E. Hobaugh.
Territory: Pennsylvania, New York, Ohio, West Virginia.
Specialization: 2, 4, 15, 16, 17, 18. Also timber damage appraisals; photogrammetric cartography, civil engineering.

B. C. Sherrill, Consulting Forester, 515 Coyote St., Nevada City, California. Associated with J. F. Siegfried. Licensed Land Surveyor.
Territory: California; pine, redwood and fir.
Specialization: 4, 10, 15, 16, 17, 18. Also aerial photo interpretation, licensed land surveys, and Christmas tree management.

***Cedric Sidney**, Consulting Forester, 111 Rosewood Drive, Hammond, Louisiana.
Territory: Southeast Louisiana, south Mississippi.
Specialization: 3, 4, 5, 6, 7, 16, 17, 18.

William R. Sizemore & Co., Foresters, Surveyors, and Land Managers, Tallassee, Alabama.
Consultants: William O. Gairns, William R. Sizemore, and Mary H. Sizemore (S.A.F. Associate Member).
Territory: Southeast.
Specialization: 2, 3, 4, 8, 11, 13, 15, 16, 17, 18.

Samuel S. Snook, P. O. Box 521, Walterboro, South Carolina.
Territory: South Carolina.
Specialization: 4, 15, 16, 17.

Dean Solinsky, Hobart Bldg., San Francisco 4, California.
Territory: California.
Specialization: Timberland appraisals and management.

***Seymour I. Somberg**, 100 Rogers Court, Birchwood Park, Williamsburg, Va. Phone CApital 9-5348.
Territory: Southeastern U. S. and Latin, Central, and South America.
Specialization: 2, 3, 4, 8, 10, 11, 13, 15, 16, 17, 20. Acquisition and management for investors; forest resource surveys for industry.

South Carolina Forest Management Service, Ritter, South Carolina.
Forest Consultant: Hugo J. Pawek.
Territory: West Virginia, Virginia, North Carolina, South Carolina, Tennessee, Georgia, Florida, and Alabama.
Specialization: 3, 4, 5, 6, 7, 16, 17.

Southeastern Foresters, Forest Consultant, 8113 Fort Caroline Road, Jacksonville 11, Florida.
Consultant: Nelson B. Blocker.
Territory: Southeastern U. S.
Specialization: 3, 4, 6, 8, 12, 13, 15, 16, 17, 18. Also timber resource investigations; timberland management; timber and land sales; insurance company representative for loans on forest properties.

Southern Timber Management Service, Home Office, 209½ N. 21st, Birmingham, Alabama. Branch offices: 404 Montgomery Ave., Sheffield, Alabama; P. O. Box 723, Auburn, Alabama; 328 Brentwood Lane, Mobile, Alabama; 415 Friar Rd., Chattanooga 11, Tennessee; P. O. Box 564, Brookhaven, Mississippi; 703 James Blvd., Signal Mt., Tennessee, and 1620 Moreno St., Pensacola, Florida.
Consultants: *J. M. Bradley, W. H. Mullins, H. E. Murphy, C. B. Umland, Tom Newman, *Charles R. Page, Harold Hicks, Guy Parsons, Alvis Dearman, Dennis Donavan and Carl Streck.
Territory: South Central Atlantic and Caribbean.
Specialization: 1, 2, 3, 4, 8, 10, 11, 12, 13, 15, 16, 17, 18, 21. Also acting as timberland investment counsel and land agent and forester in charge for private, commercial, and absentee-owned timberlands of all sizes with optional complete timber stand improvement cutting, milling, and T.S.I. operations as a service under contract. Contracted objectives under long-range management contract offered. Resource surveys and industrial plant location services. Tree seed extractory. Direct seeding and chemical hardwood spray control.

Frank Spearey, Consulting Forester, Registered Public Surveyor, P. O. Box 1249, Jacksonville, Texas.
Territory: Gulf States.
Specialization: 4, 15, 16, 17. All phases of land management.

Wallace R. Stacy, Consulting Forester, P. O. Box 21, Walterboro, South Carolina.
Territory: Within 100 miles of Walterboro.
Specialization: 3, 4, 6, 7, 13, 16, 17, 18. Also growth studies, timber marking, fire damage appraisals, forest mapping, timber trespass appraisals, pulpwood and timber sales, timberland agent for absentee timberland owners.

T. J. Starker and Son, 3855 Van Buren Street, Corvallis, Oregon.
Operating consultants: T. J. Starker, Bruce Starker.
Territory: Oregon.
Specialization: 1, 3, 4, 10, 16, 19, 21.

J. F. Stauss, Consulting Forester, 9 Nowlan Road, Hillcrest, Binghamton, New York.
Territory: Northeast and Canada.
Specialization: 2, 3, 4, 8, 10, 11, 13, 15, 16, 17, 18. Also marketing and other forest products; litigation and damage claims.

Charles T. Stealey, Jr., Consulting Forester, 1505 N. Roberson, Conroe, Texas.

Territory: Texas and surrounding states.
Specialization: 4, 6, 7, 13, 16, 17, 18.

*Edward F. Steigerwaldt, Consultant Forester, Star Route 2, Tomohawk, Wisconsin.
Territory: Lake States.
Specialization: 4, 8, 11, 13, 15, 16, 17, 18. Also aerial photography plans, forest surveys, forest photography, photo interpretation, and property management for absentee land owners.

Fred Stell, Consulting Forester, P. O. Box 42, Glenwood Springs, Colorado.
Territory: Colorado, Wyoming, New Mexico.
Specialization: 4, 6, 9, 14, 15, 16, 17, 18.

Stevens Forestry Service, Consulting Foresters, Box 1070, El Dorado, Arkansas.
Consultants: *Irwin E. Stevens, Jim W. Bottoms.
Territory: Southern states.
Specialization: 1, 3, 4, 11, 13, 15, 16, 17, 18.

Raymond E. Stevens, Consulting Forester, 4416 McCulloch Street, Duluth 4, Minnesota.
Territory: Northern parts of Minnesota, Wisconsin.
Specialization: 4, 15, 16, 17, 18. Also field investigation and forest litigation.

John W. Stock, Consulting Forester and Licensed Land Surveyor, Tupper Lake, New York.
Territory: Adirondack Mountains.
Specialization: 3, 4, 10, 15, 16.

William S. Stover, 6178 Louisville Street, New Orleans 24, Louisiana.
Territory: South, but not limited.
Specialization: Forest resource and related investigations; design and planning of forest inventories, and other studies.

W. W. Talbert, Forest Consultant, 1112 Pershing St., Lufkin, Texas.
Territory: Texas and surrounding states.
Specialization: 4, 6, 16, 17, 18.

Technical Services, Inc., Consulting Foresters, 415 Broad Street, New Bern, North Carolina.
Consultants: William H. Utley, Nelson M. White.
Territory: North Carolina.
Specialization: 4, 15, 16. Also forest appraisals and investments, industrial investigations, tax evaluation—public and private.

Tex-La Land Management Service, P. O. Box 354, Kirbyville, Texas; P. O. Box 38, Jasper, Texas.
Consultant: *A. C. Bace, Jr.
Territory East Texas and western Louisiana.
Specialization: 3, 4, 5, 6, 7, 11, 13, 16, 17, 18. Also acting as land and forest managers for private, commercial, and absentee-owned timberlands as a service under contract.

Thaddeus Thorne, Consulting Forester, Center Conway, New Hampshire.
Territory: Northeast.
Specialization: 2, 4, 15, 16, 17, 18. Timber sales, marking, forestland real estate.

Tillinghast & Reed, Consulting Foresters, Danville, West Virginia, Phone: Madison, West Virginia, 771.
Consultants: *John Tillinghast, *Marvin Reed, Carl M. Van Husen.
Territory: West Virginia, eastern Kentucky, western Virginia.
Specialization: 3, 4, 6, 15, 17, 18, 19, 20. Timberlands in coal-producing areas a specialty; services available on job basis or on annual retainer fee. Also dealers and distributors forestry equipment.

Timber Management Service, P. O. Box 953, Klamath Falls, Oregon.
Consultant: *Robert W. Mezger.
Territory: Ponderosa pine region.
Specialization: 2, 3, 4, 6, 8, 15, 16, 17, 18.

J. M. Tinker, Registered Forester, Statesboro, Georgia.
Territory: Savannah trade area.
Specialization: Timber cruising, marking, marketing and consulting.

Anton J. Tomasek, 1828 Lincoln, Des Plaines, Illinois.
Territory: Illinois, Indiana, Michigan, and Wisconsin.
Specialization: 3, 4, 9, 11, 16, 18. Also tree diseases and insects, forest recreational development.

Tree Farm Management Service, Inc., 1166 7th Avenue West, Eugene, Oregon.
Consultants: *Verne D. Bronson, chief forester; *Lyle H. Seymour, John W. Davis, H. N. Cory.
Territory: Not limited.
Specialization: 2, 3, 4, 5, 6, 7, 8, 9, 13, 15, 16, 17, 18. Complete tree farm management, inventory and special studies of forest lands, salvage harvest supervision, forestry research, aerial photo procurement and interpretation.

Tree Farmers, Inc., Consulting Foresters and Forest Operations Contractors, 2805 La Salle Dr., Alexandria, Louisiana. (Field Hdqrs. at Flora, La., and Glenmora, La.)
Consultants: Frank W. Bennett, James E. Moore, Lewis C. Peters, and Kenneth W. Reviel.
Territory: Southern U. S.
Specialization: 3, 4, 6, 7, 8, 10, 11, 14, 16, 17, 18. Retained as consultant-managers by medium-sized landowners (500 to 50,000 acres.) Manage all forest land resources, including timber, minerals, grazing, wildlife, etc. Contracting of all phases of forest operations, including logging, milling, marketing, planting, direct seeding, cull tree removal, construction and maintenance of fire protection systems, boundaries, fencing, etc.

Henry H. Tryon, Consulting Forester, retired, 327 Mountain Road, Cornwall-on-Hudson, New York.
Specialization: Sprout hardwoods.

Van Vliet and McKimmy, Forest Products Specialists, 1336 Dixon Street, Corvallis, Oregon.
Consultants: A. C. Van Vliet and M. D. McKimmy.
Territory: Oregon, Washington, and California.
Specialization: 3, 11, 19, 20, 21. Also industrial engineering applications, feasibility studies, production and quality control techniques, and analysis of specific problems related to wood properties in the production of forest products.

James M. Vardaman & Company, First National Bank Bldg., Laurel, Mississippi.
Consultants: James M. Vardaman and John D. Guy, Jr.
Territory: Southeastern United States.
Specialization: 16, 17. Also own and operate medium-sized tree farm.

Wall and Larson, Foresters, 5524 Elvas Avenue, Sacramento, California.
Consultants: Myron S. Wall, Jr., Jack E. Larson, James F. Nicklos, Henry C. Schwarz.
Territory: Western states.
Specialization: 2, 3, 4, 6, 7, 8, 10, 11, 15, 16, 17, 18. Also licensed surveying; aerial photo interpretation; land and timber sales and supervision; land valuation and appraisal; log scaling service.

Robert D. Washburn, Forestry Consultant, Route 1, Box 461, Marquette, Michigan.
Territory: Upper Michigan and the Lake states.
Specialization: 2, 4, 10, 15, 16, 17. Also land appraisal. Registered surveyor, registered forester, State of Michigan, and real estate broker-appraiser.

Arthur J. Weinheimer, Consulting Forester, R.F.D. # 1, Old Chatham, New York.
Territory: Eastern New York.
Specialization: 4, 18.

Edward H. Werner, Consulting Forest Engineer, 3122 H Street, Sacramento, California.
Territory: California.
Specialization: 3, 4, 10, 16. Also location of timberlands, ownership and land-title searching, timber tract consolidation potential, logging chance studies, economical aspects of second growth stands, and personal representative for buyers and sellers of timber and range lands.

Western Timber Services, Arcata Hotel, Arcata, California.
Consultant: Robert E. Kleiner.
Territory: Not restricted.
Specialization: 2, 4, 8, 10, 15, 16, 17, 18.

*J Atwood Whitman, Consulting Forester, Glendon, North Carolina.
Territory: Eastern and southern United States.
Specialization: 2, 3, 4, 8, 15, 16, 17, 18. Also forest damage appraisal, forest litigation, growth analysis,

timber type maps and municipal forestry.

S. A. Wilde, Soils Department, University of Wisconsin, Madison 6, Wisconsin.
Territory: Wisconsin, Minnesota, Michigan, Missouri, Illinois, Indiana, Ohio.
Specialization: 18. Including survey of forest tracts, selection of planting sites, management of forest nursery soils.

John F. Williams & Co., Foresters, Windsor, N. C.
Territory: Southeastern U. S.
Specialization: 2, 3, 4, 13, 15, 16, 17 with emphasis on forest management and tree planting.

Richard E. Wilson, 11½ Fifth Ave., Saratoga Springs, New York.
Territory: Not restricted.
Specialization: 18. Establishment and care of plantations.

S. Leigh Wilson, Consulting Forester, 605 Camellia Circle, Florence, South Carolina.
Specialization: 3, 4, 16, 17, 18.

Fred E. Winch, Jr., Consulting Forester, Sebring Road, R. 2, Newfield, New York.
Territory: Northeast.
Specialization: 4, 11, 18. Primarily associated with maple sirup and Christmas tree production.

Paul T. Winslow, Consulting Forester, Staatsburg, Duchess County, New York.
Territory: Northeast.
Specialization: 1, 3, 4, 11, 15, 16, 17, 18.

E. T. F. Wohlenberg, Consulting Forester, 37 Highland Court, Ukiah, California.
Associated with Emanuel Fritz, Consultant, 102 The Uplands, Berkeley 5, California.
Territory: (The West): pine, redwood, and fir.
Specialization: 2, 3, 4, 6, 7, 8, 10, 11, 13, 16, 17, 18.

K. B. Wood and Associates, Inc., 601 Dekum Bldg., Portland 4, Oregon.
Territory: National.
Specialization: 2, 10, 15, 16, and 17.

J. E. Woodman, Barnett Bank Building, Jacksonville 2, Florida.
Territory: Eastern United States and Canada.
Specialization: 4, 8, 12, 13, 16.

Herman Work, 200 N. Market St., Staunton, Virginia.
Territory: General.
Specialization: 2, 3, 4, 6, 11, 13, 16.

Robert E. Worthington, Consulting Forester, Quilcene, Washington.
Territory: Olympic Peninsula.
Specialization: 2, 10, 15, 16, 17. Also registered professional engineer and land surveyor.

E. A. Ziegler, Consulting Forester, College Park, Lewisburg, Pennsylvania.
Territory: Middle Atlantic states and Southeastern states to and including Florida.
Specialization: 2, 3, 4, 6, 8, 12, 13, 15, 16, 17, 18.

CONSULTING FORESTERS, CLASSIFIED BY STATES

Alabama
Glenn O. Antonie
Richard V. Miles, III
Walter L. Mills
William R. Sizemore & Co.
Southern Timber Management Service

Arkansas
Pomeroy & McGowin
Stevens Forestry Service

California
Airview Specialists Corp.
Russell W. Beeson
Charles H. Bunting
Cal-Pacific
D. Irving Cobb
Emanuel Fritz
Hammon, Jensen, and Wallen
Glon B. Hooker
Arthur Koehler
Robert T. MacDougall, Jr.
E. D. Marshall
William R. Schofield
B. C. Sherrill
Dean Solinsky
Wall and Larson
Edward H. Werner
Western Timber Services
E. T. F. Wohlenberg

Colorado
F. Bruce Lamb
Fred Stell

Connecticut
Connwood, Inc.
George C. Kiefer, Jr.
Donald K. Maissurow

District of Columbia
Albert G. Hall & Associates

Florida
Francis H. Clifton
Deep South Consulting Foresters
E. A. Foster
Gene M. Harris
Douglas F. Horan
T. M. Howerton, Jr.
John E. Hudson
Robinson Improvement Co.
Southeastern Foresters
J. E. Woodman

Georgia
W. R. Barnhill
Edward J. Clancy
Forest Services, Inc.
Jack M. Hall
Arthur W. Hartman
E. T. Hawes
G. E. Knapp
The Langdale Company
T. A. Liefeld
The Ben Meadows Co.
John G. Rawls
Owen L. Riley
J. M. Tinker

Idaho
Intermountain Timber Service

Illinois
Anton J. Tomasek

Indiana
Carl M. Carpenter
L. E. Sawyer

Kentucky
Dudley C. Carey
John M. Crowl
William E. Jackson, Jr.

Louisiana
Henry L. Bango
Frank W. Bennett & Associates
Robert H. Cain
Inman F. Eldredge, Sr.
Farmcraft Associates, Inc.
W. H. Griffith
Ralph W. Hayes
John F. Kellogg
Frank J. Lemieux
Fred B. Merrill
Cedric Sidney
William S. Stover
Tree Farmers, Inc.

Maine
Philip T. Coolidge
Earl M. McChesney
Prentiss & Carlisle Company, Inc.
James W. Sewall Company

Maryland
John F. Davis
L. J. Enright

Massachusetts
New England Forestry Foundation
New England Silvicultural Service

Michigan
Forestry Associates
Forestry Consulting Services
Northern Tree Co., Inc.
Eino Sainio
Robert D. Washburn

Minnesota
William T. Cox
Roy Dale Sanders
Raymond E. Stevens

Mississippi
Keith Cranston
Randle J. Dedeaux
Employment Service
Forestry Suppliers, Inc.
John G. Guthrie
D. E. Lauderburn
James M. Vardaman & Co.

Missouri
National Timber Consultants

New Hampshire
Francis G. Hambrook
William P. House
H. Thorn King
Clifton LaBree
William N. Lane
Raymond H. Marshall
George W. Morrill, Jr.
Thaddeus Thorne

New Jersey
Robert L. Curtis

New York
Adirondack Forestry, Inc.
Arthur G. Axtell
Curtis H. Bauer
Allen W. Bratton
Nelson C. Brown
Capital Forestry Co.
David B. Cook
David S. Findlay
David H. Hanaburgh
Richard F. Howard
Milford C. Howard
LeRoy W. Huntington
David G. Jennings
Frank E. Karpick
J. Hugo Kraemer
Cornelius W. Kuhn
Paul C. Lemon
Raymond M. Miller
Charles H. Moyer
Pond & Moyer, Inc., Co.
A. B. Recknagel
J. F. Stauss
John W. Stock
Henry H. Tryon
Arthur J. Weinheimer
Richard E. Wilson
Fred E. Winch, Jr.
Paul T. Winslow

North Carolina
Thos. W. Alexander
Atlantic States Forestry Co.
T. S. Coile
Commercial Foresters, Inc.
Porcius F. Crank, Jr.
Elwood L. Demmon
James B. Ebert
R. W. Graeber
Alvin B. H..fer
Joseph F. Hardee
V. W. Herlevich
Gorham E. Jackson
Ralph S. Johnson
Harvey J. Loughead
William Maughan
R. A. Morin
Sandhill Forestry Co.
Technical Services, Inc.
J. Atwood Whitman
John F. Williams & Co.

Ohio
William J. Bozett
E. V. Jotter
Carol W. Marlow
James V. Meteer

Oregon
Bigley and Feiss
Brown and Brown
John S. Forrest
Good Forest Mgmt. Co.
Paul N. Goodmonson
G. W. Hult
R. Wilson Hutchison
Alex J. Jaenicke
Stuart Moir
Paul M. Sanders
T. J. Starker and Son
Timber Management Service
Tree Farm Management Service
Van Vliet and McKimmy
K. B. Wood & Associates, Inc.

Pennsylvania
S. Gayley Atkinson
Clifford B. Carts
Ralph E. Chamberlin
Di Stefano & Wessel
W. G. Edwards
Reginald D. Forbes
Harvey R. Frantz
R. C. Fraunberger
LeRoy Frontz
Joseph F. Gray
Robert Moore
Nittany Timberlands, Inc.
Northeast Forestry Service
Northern Timber Services
R. B. Shannon & Associates
E. A. Ziegler

Rhode Island
Monterey L. Holst

South Carolina
John C. Billingsley
Bishop Brothers
Lewis M. Boice
Lucas M. Dargan
Forest Products Mgmt. Co.
E. C. Haff
Giles G. Hall
Joseph F. Havel
Robert F. Knoth & Co.
Milliken Forestry Co.
Ernest Nutting & Co.
A. P. Russell
Joseph A. Schmidt
Samuel S. Snook
South Carolina Forest Mgmt. Service
Wallace R. Stacy
S. Leigh Wilson

Tennessee
Ernest E. Ahler
Charles Edward Cheston & Co.
Paul B. Davis
Green's Timber Service
Frank M. Langford
William J. Mills
Peter R. Mount
Charles R. Page, Jr.

Texas
L. L. Bishop
N. D. Canterbury
Stuart F. Clark
Ralph A. Davis
H. C. Dickerson
Chris Nelson, Jr.
W. R. Owens
Frank Spearey
Charles T. Stealey, Jr.
W. W. Talbert
Tex-La Land Mgmt. Service

Vermont
Halsey M. Hicks
William H. Meyer
Sable Mountain Corporation

Virginia
Eastern Forestry, Inc.
E. A. Friend, Jr.
Edward P. Furlow
The S. G. Keedwell Co.
Edward A. McAllister
R. B. Milne
Seymour I. Somberg
Herman Work

Washington
I. V. Anderson
George L. Drake
William A. Eastman, Jr.
Greenacres, Inc.
George S. Haynes
Norman G. Jacobson
L. D. Lloyd
A. R. Maris
Clyde S. Martin
Samuel A. Newman
W. H. Price
C. D. Schultz & Co., Inc.
Robert E. Worthington

West Virginia
Forest Land Management
Tillinghast & Reed

Wisconsin
George Banzhaf & Co.
Edward F. Steigerwaldt
S. A. Wilde

Canada
John R. T. Andrews
Belanger and Bourget
M. W. Gormely
F. J. G. Johnson and Associates
Leon A. Nix
C. D. Schultz & Co., Ltd.

Society of American Foresters
Washington 6, D. C.

Foresters' Code of Ethics

Adopted November 12, 1948

The purpose of these canons is to formulate guiding principles of professional conduct for a forester in his relations with other foresters, with his employers, and with the public. The observance of these canons secures decent and honorable professional and human relationships, establishes enduring mutual confidence and respect, and enables the profession to give it maximum service.

Professional Life

1. The professional forester will utilize his knowledge and skill for the benefit of society. He will cooperate in extending the effectiveness of the forestry profession by interchanging information and experience with other foresters, and by contributing to the work of forestry societies, associations, schools, and publications.

2. He will advertise only in a dignified manner, setting forth in truthful and factual statements the services he is prepared to render for his prospective clients and for the public.

Relations With the Public

3. He will strive for correct and increasing knowledge of forestry and the dissemination of this knowledge, and will discourage and condemn the spreading of untrue, unfair, and exaggerated statements concerning forestry.

4. He will not issue statements, criticism, or arguments on matters connected with public forestry policies, without indicating, at the same time, on whose behalf he is acting.

5. When serving as an expert witness on forestry matters, in a public or private fact finding proceeding, he will base his testimony on adequate knowledge of the subject matter, and render his opinion on his own honest convictions.

6. He will refrain from expressing publicly an opinion on a technical subject unless he is informed as to the facts relating thereto, and will not distort or withhold data of a substantial or other nature for the purpose of substantiating a point of view.

Relations With Clients, Principals, and Employers

7. He will be loyal to his client or to the organization in which he is employed and will faithfully perform his work and assignments.

8. He will present clearly the consequences to be expected from deviations proposed if his professional forestry judgment is overruled by nontechnical authority in cases where he is responsible for the technical adequacy of forestry or related work.

9. He will not voluntarily disclose information concerning the business affairs of his employers, principals, or clients, which they desire to keep confidential, unless express permission is first obtained.

10. He will not, without the full knowledge and consent of his client or employer, have an interest in any business which may influence his judgment in regard to the work for which he is engaged.

11. He will not, for the same service, accept compensation of any kind, other than from his client, principal, or employer, without full disclosure, knowledge, and consent of all parties concerned.

12. He will engage, or advise his client or employer to engage, other experts and specialists in forestry and related fields whenever the client's or employer's interests would be best served by such actions, and will cooperate freely with them in their work.

Relations With Professional Foresters

13. He will at all times strive to protect the forestry profession collectively and individually from misrepresentation and misunderstanding.

14. He will aid in safeguarding the profession against the admission to its ranks, of persons unqualified because of lack of good moral character or of adequate training.

15. In writing or in speech he will be scrupulous to give full credit to others, in so far as his knowledge goes, for procedures and methods devised or discovered and ideas advanced or aid given.

16. He will not intentionally and without just cause, directly or indirectly, injure the reputation or business of another forester.

17. If he has substantial and convincing evidence of unprofessional conduct of a forester, he will present the information to the proper authority for action.

18. He will not compete with another forester on the basis of charges for work by underbidding through reduction of his quoted fee after being informed of the fee quoted by a competitor.

19. He will not use the advantages of a salaried position to compete unfairly with another forester.

20. He will not attempt to supplant another forester in a particular employment, after becoming aware that the latter has been definitely engaged.

21. He will not review the work of another forester, for the latter's employer, without the other's knowledge, unless the latter's connection with the work has been terminated.

22. He will base all letters of reference or oral recommendation on a fair and unbiased evaluation of the party concerned.

23. To the best of his ability he will support, work for, and adhere to the principles of the merit system of employment.

24. He will not participate in soliciting or collecting financial contributions from subordinates or employees for political purposes.

25. He will uphold the principle of appropriate and adequate compensation for those engaged in forestry work, including those in subordinate positions, as being in the public interest and maintaining the standards of the profession.

REPRINTS AVAILABLE

Reprints of this Consulting Foresters Directory are available from the Society of American Foresters, Mills Building, Washington 6, D. C., at the following rates, plus mailing charges.

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How Southwestern uses

20 Cat Diesel Tractors for low-cost planting!

Several years ago the Southwestern Settlement & Development Co. embarked on an intensive forest site preparation project on its 650,000-acre holdings near Jasper, Texas. From seedlings through planting to harvesting, this division of the East Texas Pulp & Paper Company controls the operation. Twenty Cat Diesel Tractors spearhead the planting part of the project. In a recent year, these machines planted 20,000,000 pine seedlings on 24,000 acres in about 4 months.

For planting areas like the one shown here, Southwestern used 4 Cat D4 Tractors with V-plows and Lowther Wildland planters. In spite of heavy going in uncleared woods, each D4 planted an average of 9 acres per 8-hour day. With 6′ x 8′ spacing, this totaled 908 seedlings an acre. To plant cleared areas, the company used 16 D2s with single or double standard planters.

Low-cost production, of course, depends on many factors. One of the most important is high machine availability. On this score, the ruggedness of Caterpillar track-type Tractors has been *proved* on job after job in all types of woods operations. Equally important to availability is a reliable source of prompt service. You can depend on that 24 hours a day from your Caterpillar Dealer. You can also depend on him for practical information about Caterpillar-built machines on forest site preparation. Call him today!

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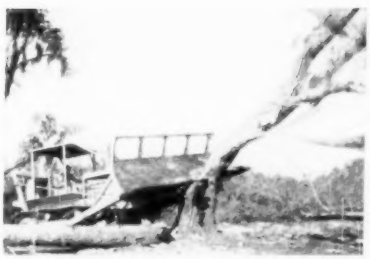

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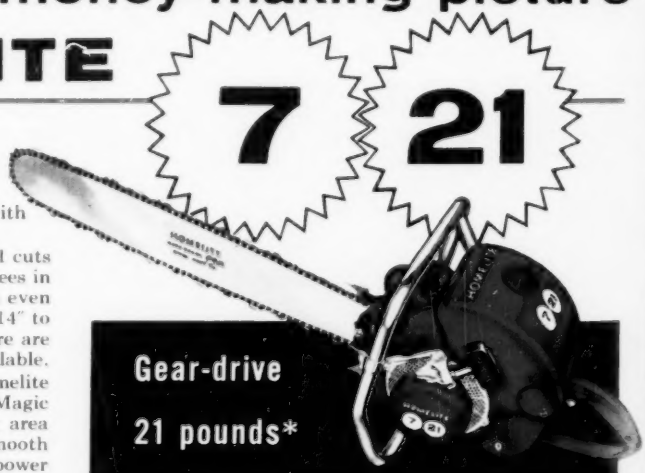

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